diesel power

December 1960

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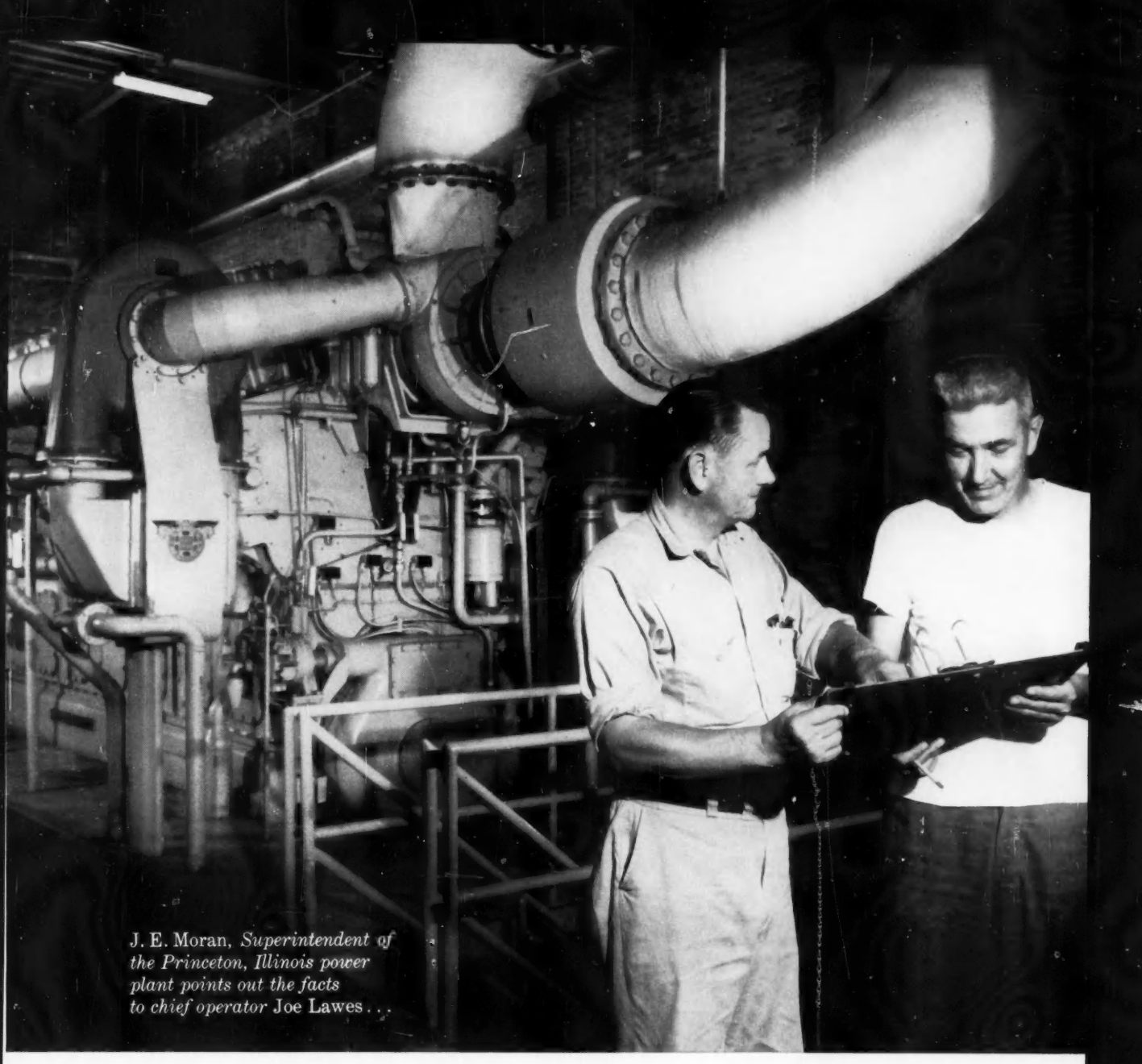

J. E. Moran, *Superintendent of the Princeton, Illinois power plant points out the facts to chief operator* Joe Lawes . . .

From Princeton: A lesson in engine economy

The facts from Princeton, Illinois: in 7 years' operation of two Cooper-Bessemer engines, repair costs have been nil! They've never had the heads off. Maintenance has been confined to annual inspection and cleaning. The Turbo-cooled 4205 hp LSV-16 shown has operated 16,281 hours since installed in 1958. A 3600 hp LSV, installed in 1953 has logged 25,471 hours.

When you're planning expansion or modernization, take into account the proven economy of Cooper-Bessemer engines. Get all the facts from our nearest office.

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SPEAKING OF LONG-LASTING RINGS . . .

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Get 2 to 4 times longer efficient ring life in your engines by using Pedrick chrome-faced compression rings. And, for any or all your ring problems, feel free to consult our Engineering Dept. Write or phone: WILKENING MANUFACTURING Co., Philadelphia 42, Pa. In Canada: Wilkening Manufacturing Co. (Canada) Ltd., Toronto 2.

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PEDRICK PIONEERED *conformable* RINGS FOR BIG-BORE ENGINES

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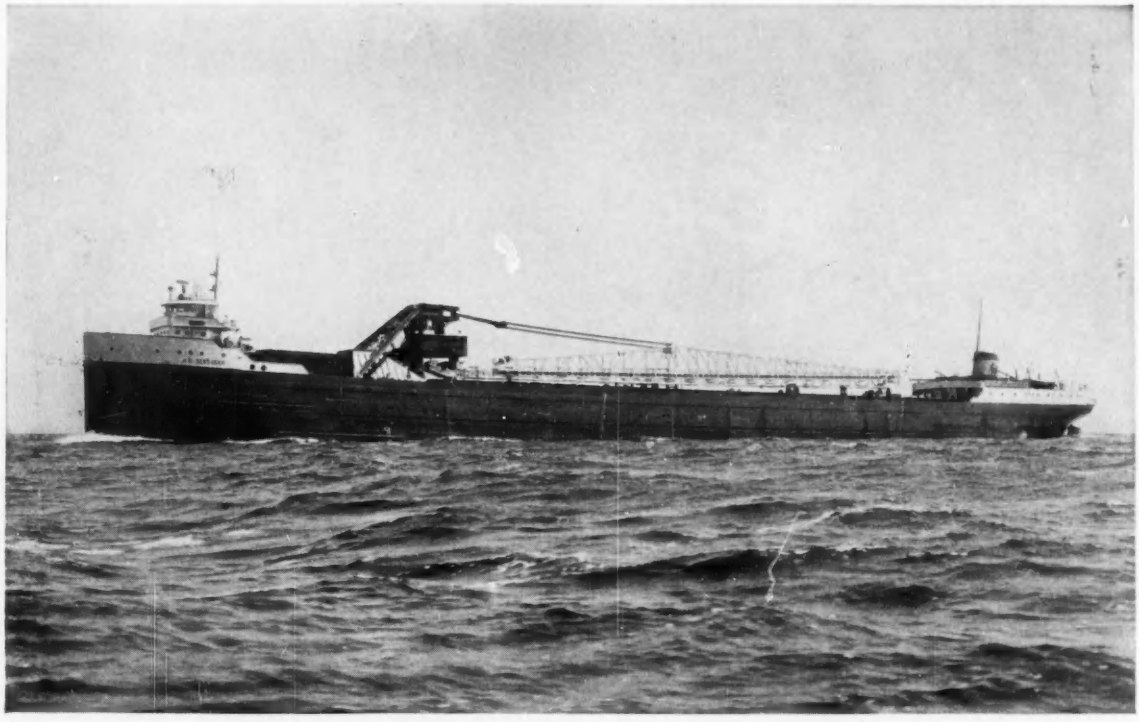


Newly-converted, self-unloading bulk cargo carrier, *M/V J. R. Sensibar.*

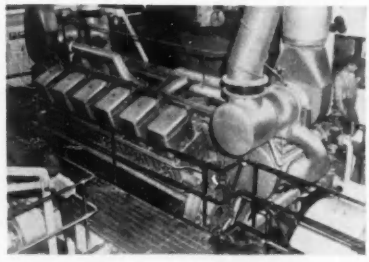
BENDIX DIESEL FUEL INJECTION PLAYS KEY ROLE IN RE-POWERING, MODERNIZING "J. R. SENSIBAR"

The *M/V J. R. Sensibar*, 552-foot, self-unloading coal carrier in Great Lakes service, recently was re-powered and modernized by her owners, the Columbia Transportation Division, Oglebay Norton Company, Cleveland.

The job, done by the Christy Corporation of Sturgeon Bay, involved replacing the old steam turbine drive with a new Nordberg marine diesel engine. Developing 3200 hp at 515 rpm the new engine provides power for both propulsion and the self-unloading system.

The *J. R. Sensibar* now makes 15 mph, an increase of 3 mph over her old speed. In addition, the new equipment requires less engine room space, resulting in a 1200-short-ton increase in the ship's coal-carrying capacity.

The Nordberg engine is served by Bendix® Diesel Fuel Injection equipment. This equipment fits in perfectly with any modernization plan, assuring more dependable, economical performance around the clock. It is particularly valuable where 12-month operation is impossible, as in the Great Lakes. Every minute counts in this kind of shipping, and Bendix Diesel Fuel Injection helps keep the engine *on the job*. Leading diesel engine builders have confidence in it, and you can, too. For full information write Scintilla Division, The Bendix Corporation, Sidney, New York.



Nordberg type FS-1312-HSC 4-cycle, Supairthermal, non-reversing marine diesel engine has dependable Bendix Diesel Fuel Injection equipment.

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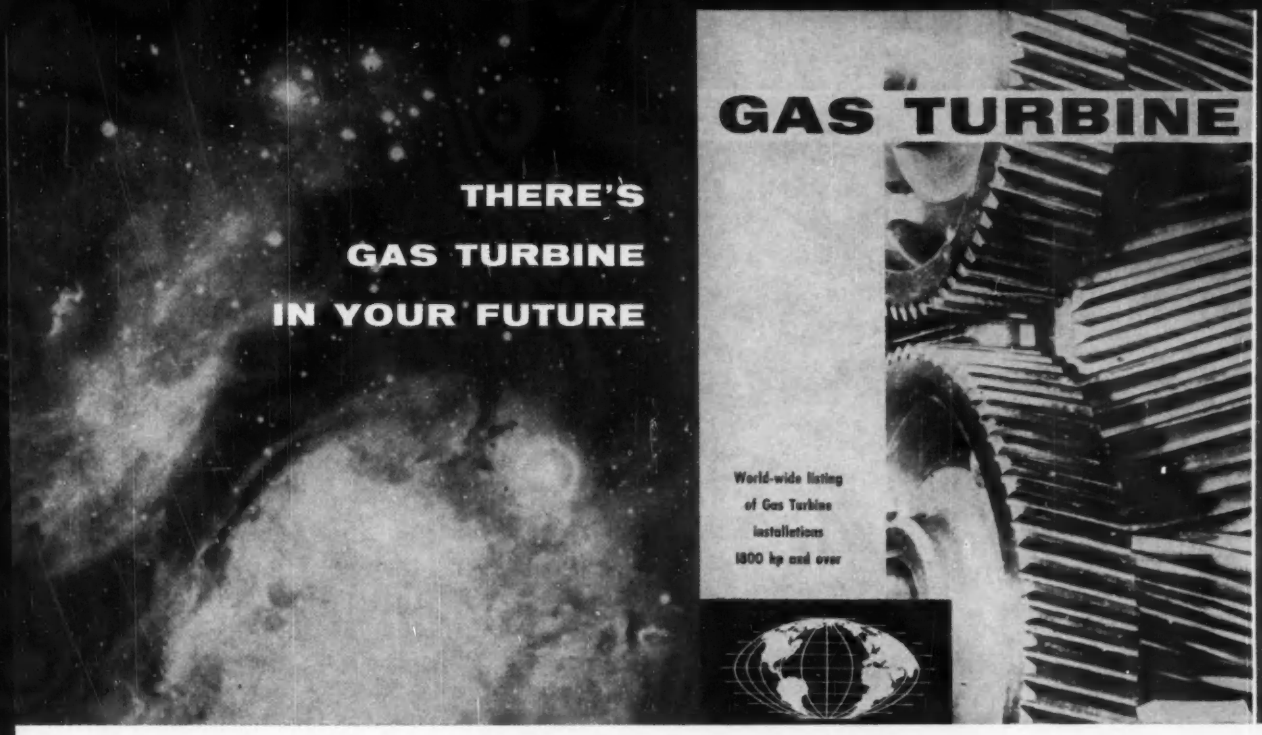

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technical briefs

advertisers index

IN THIS FEAT OF TIME JUMPING, we shall substitute facts for the conventional crystal ball — facts which will give you a personal view of the purpose and scope of GAS TURBINE.

This is a bi-monthly publication devoted to the interests of design, application and operation engineers in the field of gas turbine manufacture as well as the many fields of commercial and military usage.

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Turbocharged Diesel Power! Compare operator (arrow) with size of diesel engine beneath him for a clearer picture of power used to hustle this off-road earthmover. Cast nickel-alloyed parts help deliver extra power, help cut operating and maintenance costs in this heavy-duty turbocharged diesel.

In International's new Turbotorque® diesel...

Nickel-alloyed castings help deliver extra power, cut operating costs

This is International's Payscraper®—powered by International's new UDT-817 Turbotorque® engine, a four-cycle, 370 h.p. turbocharged diesel.

To meet the demands of rugged off-road operating conditions, engineers at International specified nickel-alloyed castings for the engine's critical parts.

For the twin cylinder heads, nickel cast iron was the choice. Nickel cast iron parts have the strength needed for reliable, heavy-duty service—the pressure-tightness demanded by high-compression engines.

For turbocharger casings, Type D-3 Ni-Resist* nickel-alloyed austenitic ductile iron was specified because it withstands internal temperatures as high as 1400° F—shrugs off wear and scaling—stands up to the corrosive combustion gases.

For piston ring carrier inserts, Type 1 Ni-Resist* nickel-alloyed austenitic iron was selected. It assures strength and wear resistance—keeps inserts from pounding out of shape at high operating temperatures.

You'll find that wherever the going is rough, cast nickel-alloyed engine parts assure built-in economy and operating efficiency. They provide the mechanical properties you need to boost diesel life and slash maintenance costs. Whether you build or use heavy-duty diesels you'll do well to *specify* nickel-alloyed engine parts.

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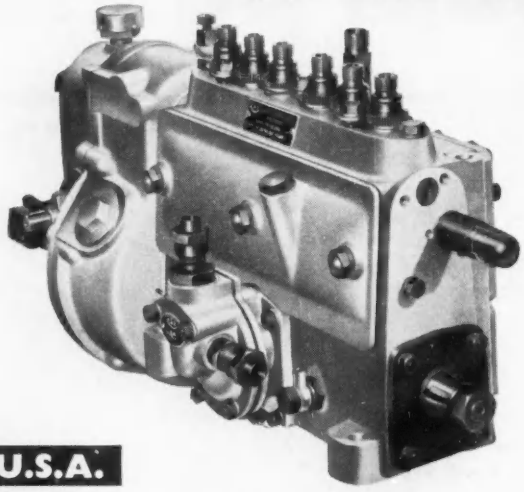

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diesel power

editorially speaking

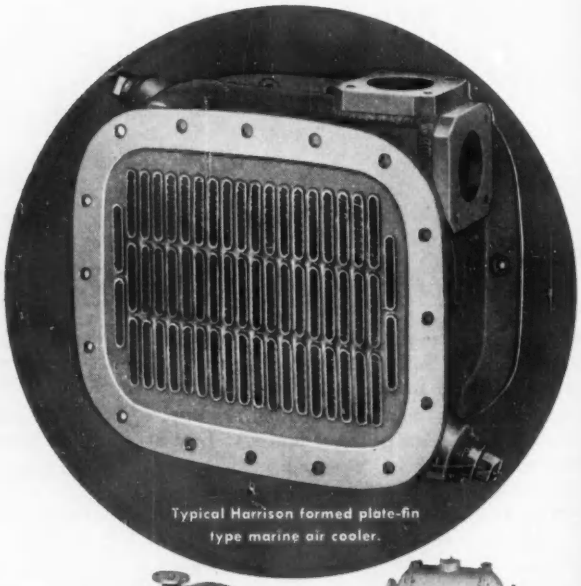
Our Christmas Fable

In this land of many chariots, the builders did continue year by year to make them bigger and more ornate. So big did they become that they filled the byways and it became a labor to find space in which to leave them in the villages. They moved swiftly, more swiftly than need be, and for this many horses were required. And all these horses did eat a lot. Then it came to pass that men from across the seas brought a new vision of what a chariot should be. Small, these chariots were very nimble in the busy streets. With few horses, eating less, these chariots did not drain the owner's coffers. Yet they served the purpose—to carry people from here to there. At first the land's chariot builders did scoff, making all manner of jokes. Yet one morning they awoke to find that the people liked the small chariots and were buying them in numbers such as to hurt their business. Seeing the message inscribed on the wall, they finally believed, built smaller chariots and recovered some of their lost trade. This lesson they learned, albeit late, applies not to them alone. For in this land there were also many carts that did carry the goods of commerce. Many large carts, going long distances, were pulled by special horses called diesel. Diesel did its daily work, longer and at far less cost, saving much silver for its owner. Yet owners of smaller carts, working them many hours in crowded streets but going little distance, had equal need for the saving of diesel. Many sought them, even replacing their horses with diesel at high cost, for the builders of small carts would not or could not provide them. Again, men from across the seas, having done this to great advantage in their own lands, did bring over their small carts with diesel. As with the chariots the beginning was small but they did start to prosper for the demand did truly exist. And what of the future? Who will supply the need? Time alone will tell but, verily, I say unto you. "No one ever went broke giving the customer what he wanted at a price he could afford."

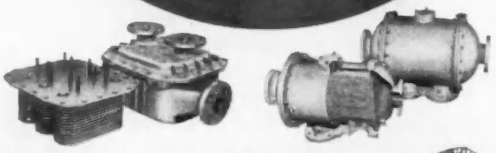
B. P. E.

General Motors Reliability in Action...

MISSISSIPPI TITAN RELIES ON GM HARRISON for COOLING



Typical Harrison formed plate-fin type marine air cooler.



Harrison heat exchangers are quality products of General Motors Research and Engineering.

HARRISON OIL COOLERS PROVE RELIABLE IN VITAL APPLICATION

Plying Mississippi waters between St. Louis and New Orleans, the MV UNITED STATES, one of the nation's largest towboats, does a whale of a job. And there's plenty of cool auxiliary power on board with Harrison oil cooler-equipped GM Diesel engines. Reliable Harrison heat exchangers are specified for the Diesels that power the generators furnishing vital electric power for communications, lighting, air conditioning and navigation aids. Harrison reliability—"measurable excellence"—results in heat transfer products that do the job you want them to do . . . for as long as you expect them to do it. This *is* the kind of reliability you can get in a wide range of basic types of Harrison heat transfer construction—a complete line of designs which permits the selectivity that assures the *right* heat exchanger for every application. Save time and money on your temperature control problems—call in a Harrison Sales Engineer at the design stage.

Free For an informative 48-page brochure on the complete Harrison line . . . write to Department 902.

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HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

For more information write in No. 310

diesel power news section highlights

FPC FISCAL FIGURES IN . . .

A whopping 402,600 in compressor horsepower was added to US natural gas lines during past fiscal year ending June 30th according to Federal Power Commission.

ALLIS-CHALMERS EXPANDING . . .

A-C's Harvey, Ill. engine plant is expanding (by 515-thousand sq ft) to take care of increase demand for their diesel, natural gas and butane engine. Over 71-thousand sq ft is also being added to A-C's Independence, Mo. plant.

VIVE LA CATERPILLAR . . .

Caterpillar Tractor has a new French branch that will be devoted to turning out its famed Cat tractors and front-end loaders for the French-European common market. First production run is slated to begin early in '61. Cat's W. J. Bornholdt will be heading up the new subsidiary.

DIESELS VS GAS? ONLY $1097 LIST DIFFERENCE FOR I-H'S 160 TRUCK!

International Harvester's 110 hp 301 diesel is being factory-installed in their B-160 and BC-160 trucks—and the price difference is surprisingly low, reported just under $1100! I-H reports that their 301 is seeing lightload/shorthaul service throughout US with heavy emphasis in Texas, New Orleans, California and Eastern Seaboard. I-H credits their sales success to combination of specification, performance, price and early investment recovery time.

SMALL DIESEL MANUFACTURERS PAY HEED!

Wall Street Journal reports air conditioning people are experiencing big business upswing. Thermo-King Company, for instance, maker of truck refrigeration units, has recently been turning out "add-on" units for older buses and reports business during '60 was "better than ever before". City transit officials across the nation are trying to inveigle new riders to take the bus—and they're using air conditioning as one bait.

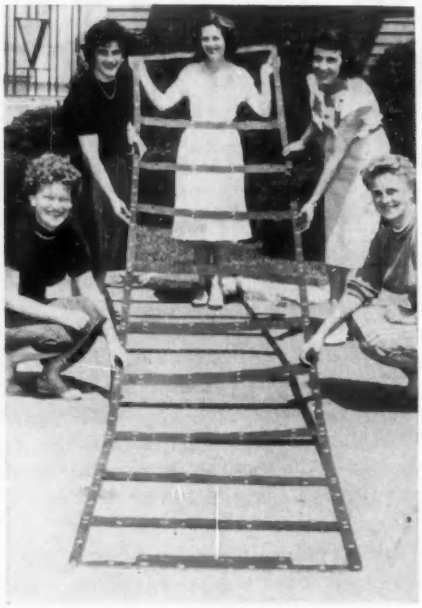
REPORT SEES 550-BILLION TON-MILES FOR TRUCKS BY 1975 . . .

New York Wall Street investment firm predicts, in a 57-page booklet, that US trucking business will double in volume during next 15 years. Shields & Company sees 550-billion ton-miles for US trucking by 1975 . . . with acquisitions and mergers also on the upswing to fight rising cost-narrowing profit margins. Report states that the trucking industry, employing upwards of 8-million persons today, operates 11-million trucks and combinations within the federally-regulated for-hire segment alone and takes in $7-billion in annual revenues!

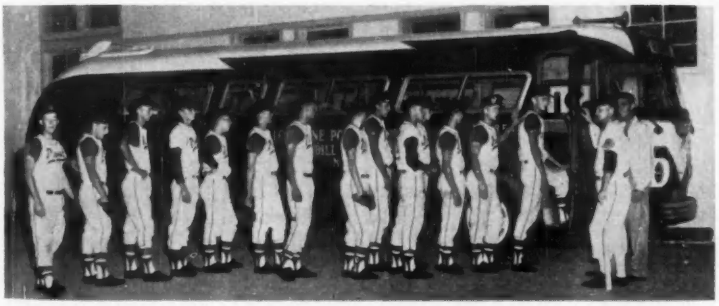
THEY'VE BEEN WORKING ON THE RAILROAD . . .

Transport Economics, monthly publication of the Bureau of Transport Economics and Statistics Interstate Commerce Commission, has some figures on age of locomotives on Class I roads. In 1950 there were roughly 10,000 units that are now 10 years old or better —that's just under 37 per cent of total units in use today. By 1954 there were 12,700 units in use or 45 per cent of today's total that is six or more years old. Adds up to fact that sizable number of US locomotives are getting into mileage stage where extensive re-manufacture or steps beyond routine rebuilds begin to be required. What are the economic solutions? Most manufacturers recommend a complete re-manufacture with upgrading. EMD used to but now recommends "trade-in" for new models under a new plan—EMD states it's the most economic for railroads.

diesel power news section

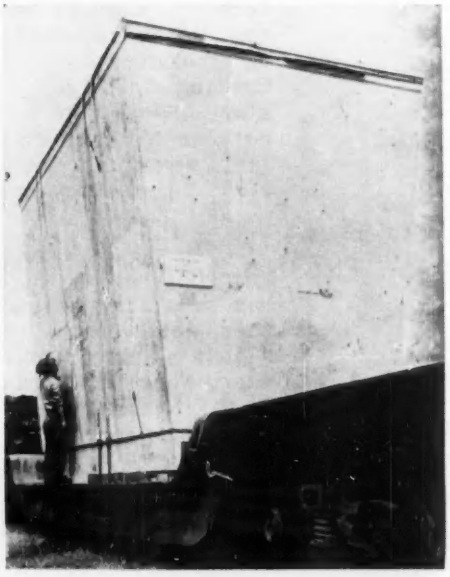


Gad! What a Gasket!
It's the biggest gasket Vellumoid Company ever turned out—over 15 ft. long, 31 in. wide! Where's it going? On a 10-cyl Cooper-Bessemer natural gas engine. Gasket fibers are impregnated with synthetic resins that provide tight oil seal. The girls? They're employees.



Repowering Hits A Homer!
American Legion Yellowstone Post Number 4 from Billings, Montana uses this 29-passenger coach to take its team to out-of-town ballgames. It's been repowered with a 4-cyl, Series 53 Detroit Diesel . . . and the legionnaires report mileage jumped 100%—from 4.5 to 9.5 mpg on Montana's rugged mountain highways.

Don't Open Until Xmas!
This is one of seven Cooper-Bessemer diesels slated to drive electrical generators for US Army's Zeus missile killer missile. It's a top secret project—that's why all the cover-up. The seven diesels were moved on 24 railroad cars . . . took 911 man-hr to pack, box and load. Took 75 kegs of nails, 10 rolls of poly, 30 rolls of band iron, 25 rolls of roofing paper, 340 sheets of plyscore, 17,000 ft of hard lumber, 38,000 board ft of soft lumber and—oh, yes—16 rolls of tape! ! !



Simms Motor Units Shows New Products

Simms Motor Units introduced six entirely new products at the recent Commercial Vehicle Show at Earls Court.

Included were: Minimec Fuel Injection Pump; a new Starter Motor; High Output C.C. Dynamo; Fuel Oil Filter; Transistorized Control Equipment; and a Compressor Unit.

Make it DIESEL For Short Haul Economy!

Repair and servicing costs drop as length of haul increases. Average for intercity vehicles is 4.7 cents, not including fuel and oil. These facts were revealed in a report just completed by the Research Department of the American Trucking Associations as the second phase of a continuing study of vehicle maintenance costs and practices designed to develop maintenance yardsticks for the industry. Entire project was launched in February, 1958 under a grant from the Budd Company to the ATA Foundation.

Sure looks like Diesel fuel is the answer to the short haul, light load situation. Users can get the best break, economically, by going diesel!

Nordberg Diesels Come of "Space Age"

Nordberg Manufacturing Company is making 48 Diesel generators for Titan missile bases.

Six Nordberg diesels with a total capacity of 8000 hp provide the sole power source for Atlas Missile bases at Vandenberg Air Field, California.

Military planners at Cape Canaveral learned that an independent source of power could provide sufficient stable current to launch, guide and track missiles. All other facilities at Vandenberg, including the Thor missile complexes, are dependent on public utility power.

The Nordberg engines are oil burning, 4-cycle, 8-cyl turbocharged diesels rated at 1344-hp. The diesels for the Titan bases are rated at 1450-hp.

(Continued on page 17)

FRESH WATER
FUEL FREE
WHEREVER YOU HAVE A DIESEL
WITH THE NEW
AMF-MAXIM
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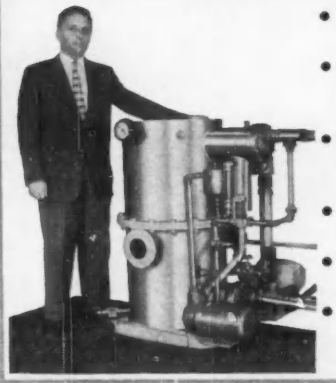

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- SIMPLE TO OPERATE
- INEXPENSIVE TO MAINTAIN
- LOW INITIAL COST

This new line of AMF-Maxim Heat Recovery Evaporators depend on engine jacket water, or any other hot water, as a heat source. Ranging in capacity from 150 GPD (which can be produced from a 30 HP engine) to 12,500 GPD, they are ideal for fresh water production wherever diesels are in use in locations that have some source of raw water, salt or brackish. Purity of water produced exceeds U.S. Dept. of Health requirements. Other AMF-Maxim Evaporators are available with capacities ranging up to more than 1,000,000 gallons per day.

For further information, write AMF-Maxim Evaporator Division at the address below.

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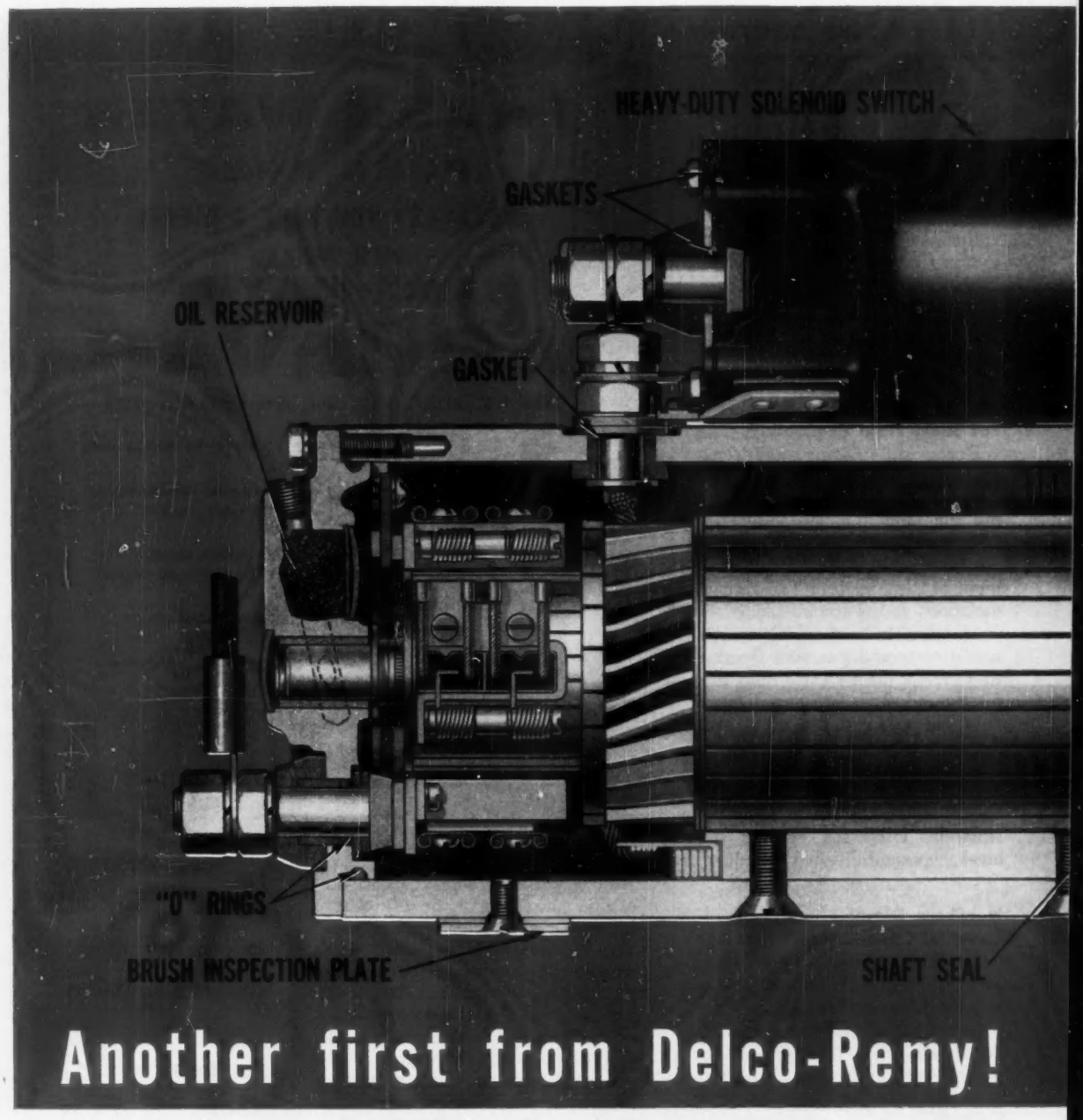


Another first from Delco-Remy!

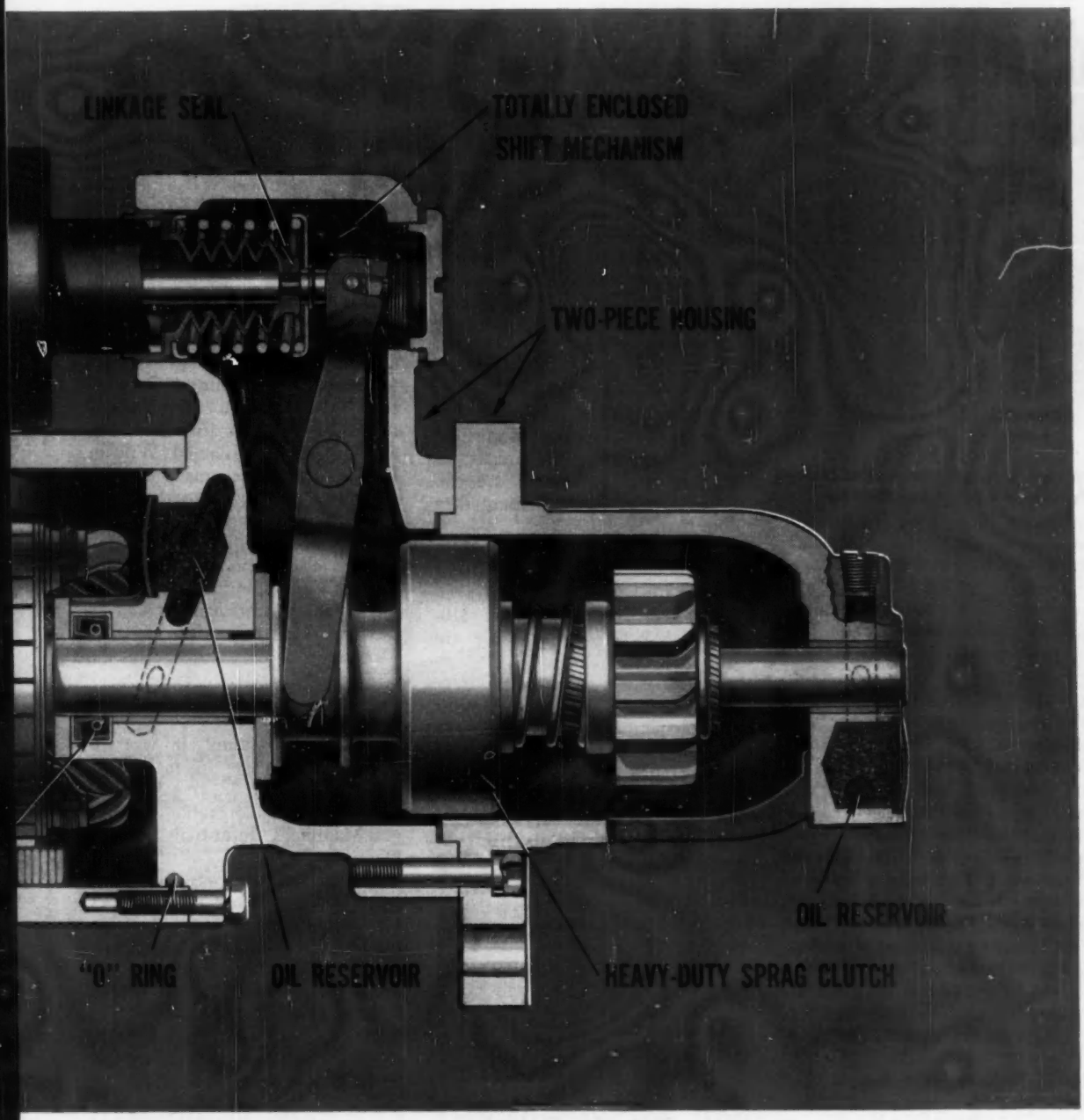
NEW DELCO-REMY HIGH-OUTPUT MOTOR

Completely new series of high-output cranking motors! These 12-volt motors have the torque and speed to do the same job as 24-volt motors of equal size *and on the same battery power*. No need for series-parallel switches and their complicated wiring on engines up to 900 cubic inches. These solenoid-operated, over-running clutch type heavy-duty cranking motors come with special two-piece drive housings that permit 24 different motor mounting positions. Their new 50% longer brushes, together with sealing rings (optional) and large oil reservoirs (optional), assure extra-long operating time between overhauls.

TOTALLY ENCLOSED DRIVE SHIFTING MECHANISM is protected against dirt, water, slush and ice. This enclosure, plus the shaft seal and linkage seal, also blocks transmission oil leakage into the motor and solenoid.

TWO-PIECE DRIVE HOUSING DESIGN permits 24 different solenoid positions which allows greater standardization—cuts fleet inventories. Nose housings are available in S.A.E. #2 and #3 mountings.

HEAVY-DUTY SOLENOID AND SWITCH provide positive pinion engagement and safely handle maximum starting current. Special seals keep out foreign material and allow increased contact life.



ELIMINATES SERIES-PARALLEL SWITCHES

SPRAG CLUTCH DRIVE operates with non-chamfered ring gear. Pinion indexes on spiral spline, positively engaging ring gear before power is switched on. Engagement of the pinion and ring gear is maintained during intermittent or sporadic engine firing.

HEAVY BRUSH INSPECTION PLATES resist damage from use and handling—are sealed to prevent leakage.

Engine manufacturers are invited to write directly to Delco-Remy for complete information and engineering assistance on the specific application of these new motors.

Fleet owners should specify this motor for new trucks through their truck dealers.

FROM THE HIGHWAY TO THE STARS

Delco-Remy electrical systems

GM GENERAL MOTORS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, IND.

For more information write in No. 312

J. E. DeLong

C. E. Nelson, Jr.

Nelson Elected Waukesha Motor President as DeLong Retires

Charles E. Nelson, Jr., formerly Executive Vice President, Waukesha Motor Co., was elected president at a meeting of the Board of Directors following the announcement of James E. DeLong's retirement.

Mr. DeLong has served as President for the past 25 years. He joined Waukesha in 1923 as an oil field sales engineer, advancing to Plant Manager in 1928. He was elected a Director and Vice President in 1932 and four years later became President and General Manager.

Mr. Nelson joined the company in 1929 working with the Financial Department. Following a series of promotions, he was appointed Assistant to the President in 1947, and Vice President in charge of production in 1949. He was elected to the Board of Directors in 1951 and on to Secretary and Treasurer and Executive Vice President in 1957.

Hollis, Factory Sales Rep, Hall-Toledo

Robert Hollis has been named direct factory sales representative, Hall-Toledo. He will be responsible for sales and customer relations in Ohio, Indiana, Illinois and other market areas contiguous to these states. He will be calling on jobbers and distributors as well as fleets, new car dealers, and industrial accounts. He has served as a manufacturers representative handling the Hall-Toledo line, and was formerly associated with DeGreen Sales and Service Co. of Cleveland, and Federal-Mogul Service Division.

Donaldson Acquires Hydrodyne Corp.

Donaldson Co., St. Paul, Minn., in purchasing controlling interest in Hydrodyne Corp., North Hollywood, Calif., entered the missile and avionics industry.

Hydrodyne, founded in 1956, makes components, seals, bellows and filters used in pneumatic, hydraulic and fuel systems of missiles, rockets and high speed aircraft. 40 engineers and technicians are employed, and 1959 sales amounted to more than $1,300,000.

Donaldson produces heavy duty oil bath and dry air cleaners and mufflers for internal combustion engines. Their sales were over $10-million last year. 600 people are employed.

The seemingly unrelated products of the firms will serve each other in a complementary manner in relation to fluid handling, according to Frank Donaldson, President.

Hydrodyne will be operated as a partially-owned subsidiary of the St. Paul company, from its plant in North Hollywood.

R. C. Moore

Moore Represents C. Lee Cook in New York, New England

Robert C. Moore of New York has been appointed New York and New England Sales Agent for C. Lee Cook Co., manufacturers of precision piston rings and metallic packings and rings for piston rods of all engines and compressors.

A lubrication engineer, in both marine and industrial applications, Mr. Moore was associated with the Marine Sales Department of the Gulf Oil Corporation. He will represent the complete line of the company's products.

W. D. Brumback

Brumback, Sales Manager, Continental Machinery

Continental Machinery Corporation, U.S. distributor for Yanmar diesel engines for marine and land auxiliary use, has named William D. Brumback sales manager. Mr. Brumback was vice president and general sales manager for American Marc prior to joining Continental. He has also been associated with Hallett Manufacturing as vice president and general manager and as west coast manager for Hercules Motors.

Burgess-Manning Promotions

William A. Carroll, Jr. was advanced to manager of marketing, and R. T. Oliver, Jr., to sales manager for domestic operations of Burgess-Manning's Industrial Silencer Division.

Mr. Carroll, who was sales manager, will coordinate over-all sales activities, including a newly established international operation. Having begun in the company's engineering department, he has held a number of sales positions.

Mr. Oliver, with Burgess-Manning for nine years, has held various posts in the sales department in Dallas, Chicago and New York.

Chandler Promoted by Fairbanks, Morse

John W. Chandler moves up to assistant for sales planning to the vice president, marketing in the executive offices of Fairbanks, Morse, Chicago.

A Diesel man, from away back on a Navy LCI during World War II, Mr. Chandler has been manager of the FM district office at St. Paul, Minnesota, serving eight north-central states. He has been with the company since 1946.

Fuel Injectors come CLEAN with LIX CLEANERS
No matter how dirty any part of your diesel engine may become, Lix Cleaners will remove oil, grease and burned-on carbon with speed and efficiency—saving valuable man-hours. All metals can be cleaned in the same tank at the same time, permitting more parts to be cleaned per dollar invested.
Lix Cleaners will satisfy your cleaning needs. For vital engine parts, electrical equipment, engine blocks or oil barge interiors, there is a Lix Cleaner that will DO IT BETTER and SAVE YOU MONEY.
Write for more information or a demonstration.
THE Lix PRODUCTS OF RESEARCH
300 WEST 80th STREET
CORPORATION OF MISSOURI
KANSAS CITY, MISSOURI
Address Department 30
(2651)

For more information write in No. 313

KIENE®
DIESEL
PRESSURE
INDICATOR
gives compression and firing pressures faster
SIMPLE
RELIABLE
COMPACT
KIENE
K-100
Send for Bulletin K-100
The Model K-100 Kiene Pressure Indicator accurately measures compression and firing pressures — assures the proper maintenance of diesel engines — helps prevent costly down time. Only one moving part — no friction or inertia effects — no complicated adjustments.
KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

For more information write in No. 314

Rochester Merger With American Standard

Rochester Manufacturing Co., instrument manufacturers, and **American Standard** are merging. **Clark L. Hastings**, president of Rochester Manufacturing, has indicated that plans were to continue company operations as a manufacturing facility of the **Detroit Controls Division** of American Standard.

The Rochester product line (including pressure, temperature and liquid level gauges) supplements the selection of controls, valves and switches now produced by American-Standard. American-Standard is best known for its plumbing, heating and air conditioning products for the home, but they also manufacture products for commerce and industry.

Upon completion of the acquisition, Clark L. Hastings will be appointed as vice president of the Detroit Controls Division and **Warren W. Hastings** as manager of Rochester operations.

American-Standard employs nearly 38,000 people with a sales volume close to half a billion dollars.

L. C. Michie

Michie Joins White Diesel

Lou C. Michie has joined the Diesel Engine Division of **White Motor Company** as sales representative covering the St. Louis and Chicago areas. His headquarters will be the St. Louis area.

Well known in the diesel engine industry, Mr. Michie has been associated with the business for twenty years as service and sales representative.

He'll be handling both stationary and marine engines for White, covering inland waterways from Memphis to Pittsburgh and to Chicago.

It's Happening . . . at C-B

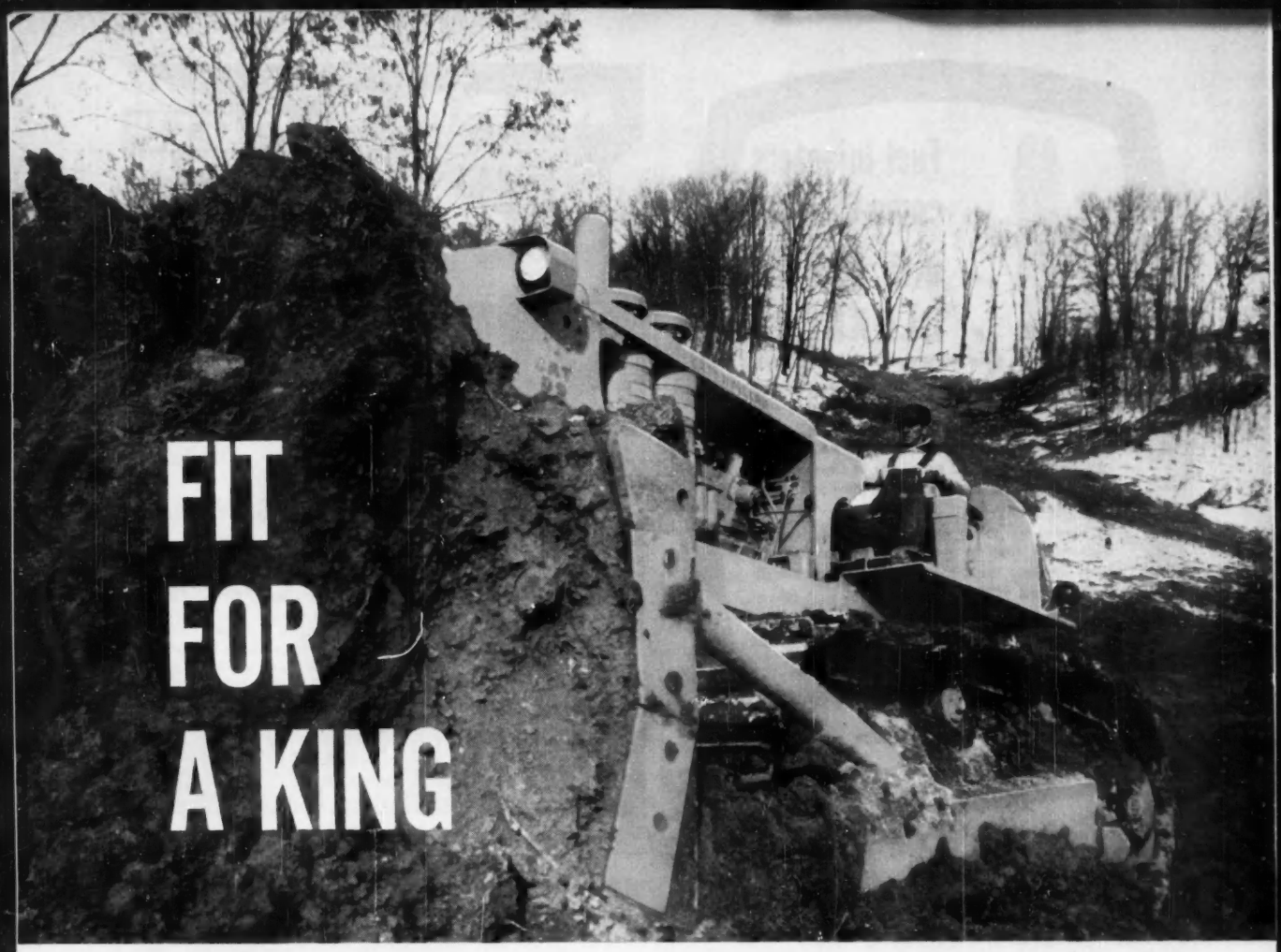
John O. Fighter has been appointed to the International Division Office of the **Cooper-Bessemer Corporation** in New York City. He has been associated with C-B since 1955 when he joined as a sales engineer.

Replacing Mr. Fighter as branch manager of the Anaco, Venezuela office is **W. R. Bohannan**, formerly a sales engineer at the Caracas office.

In another move, **James R. Craine** has been promoted to assistant manager, East-Central sales district. Mr. Craine came to C-B in 1952 as a sales engineer and was later promoted to branch manager of the Mount Vernon sales office.

Land to Direct Worthington Research

Malcolm L. Land has been appointed director or research for the Compression and Engine Division, **Worthington Corp.**, according to an announcement by **George Steven**, General Manager.

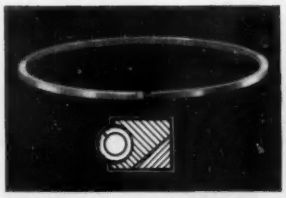


Caterpillar selects Koppers piston and sealing rings for use in the world's largest single engine crawler tractor.

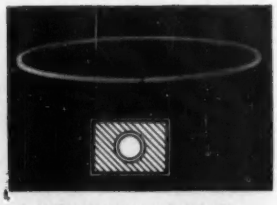
A brute of a tractor for brute force jobs, Caterpillar's D9 Series E Tractor applies a 335 HP engine which combines the versatility and economy of diesel power with the power boosting efficiency of a turbocharger. Traditional Caterpillar durability is built into every part. And in the power shift transmission sealing rings, chrome plated malleable iron compression rings, crankshaft seals, and steering control seals, that durability spells K-O-P-P-E-R-S.

Says Caterpillar: "The D9 Tractor is ruggedly built for long life under the most severe operating conditions. In addition, special attention has been given to insure the production of a power plant that is easy and economical to operate and maintain. On all these counts, the Koppers rings and seals we have selected meet our requirements of quality and dependability."

Write today for 8 page brochure on metallic sealing rings to: KOPPERS COMPANY, INC., Piston and Sealing Ring Department, 6412 Hamburg Street, Baltimore 3, Maryland.



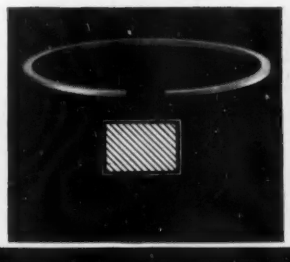
CRANKSHAFT SEALS: Application of a conformable step seal ring (specially designed for Caterpillar) establishes a *permanent* crankshaft seal, reliable for the life of the engine.

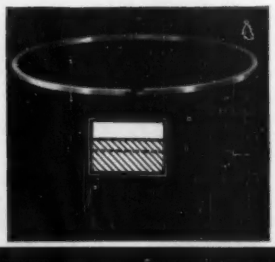


TRANSMISSION SEALING RINGS: Specially designed metallic sealing rings transmit fluid power to the rotor and actuate the clutches of Caterpillar's dramatic new power shift transmission.

COMPRESSION RINGS: Dependable performance at the most critical point in the combustion chamber is assured by chrome plated malleable iron rings.

STEERING CONTROL SEALS: Caterpillar's new design steering control requires a rotating, high pressure seal. Piston ring type seals establish simplicity, reliability.





KOPPERS

PISTON & SEALING RINGS

Engineered* Products Sold with *Service

For more information write in No. 315

In the Interest of Smog-Control

Technical information will be exchanged and cooperative efforts in testing catalytic devices for purifications of automotive exhaust gases will be undertaken by Universal Oil Products and Arvin Industries, according to a recent agreement.

Universal, a leading authority on catalysis has developed both a catalyst and a catalytic muffler for reducing noxious exhaust emissions. Arvin, a major supplier and manufacturer of automotive parts is busy with the same problem!

Reduction of automotive exhaust emissions was stimulated by passage of a California law in April of this year. The cooperative effort is expected to accelerate certifications, large-scale production and commercialization of effective and economical exhaust control devices. Agreement will enable either Arvin or Universal to use the technical information of the other in marketing its device, and Arvin, to market its device using catalyst purchased from Universal. Arvin has had an extensive research program with Battelle Memorial Institute for the past two years which it will continue independent of the cooperative effort with Universal.

Universal's development and research has produced Purzaust, a new catalytic muffler which has been offered to California authorities for testing and certification.

Just Dig A Little Hole . . .

. . . about a hundred feet down into the ice! Dump in the diesel oil, and your Arctic storage problems are over!

Yes, the Army researchers have reported such a solution to fuel storage problems in the Arctic, saying that this will in no way harm the oil's purity or usefulness. Temperatures remain a constant 17°F. The impurities settle and freeze . . . the oil remains pure. Army men at Cap Tuto, Greenland have set themselves up already with 30,000 gal of diesel oil and now plan to use the ice reservoir to store diesel oil for heating their own quarters next winter.

K. D. Evans

Product Reliability Division Created By Hercules

Combining quality control, field service and engineering, inspection and testing into a major staff function, the Hercules Motors Corporation has created a new division . . . product reliability. Keith D. Evans has been appointed manager.

The new division will be fully responsible for the quality of Hercules products from the drawing board on to completion. "Herk" is a supplier of internal combustion engines to the automotive, agricultural, mining, construction, petroleum and general industrial fields.

Mr. Evans has been associated with Hercules for 18 months as manager of quality control. He had been with International Harvester in production management posts since 1941.

Studebaker Buys D. W. Onan & Sons

D. W. Onan & Sons, a Minneapolis manufacturer of electric generating plants, was purchased by Studebaker-Packard Corp. Acquisition represents the fifth since late 1958 by the company. Combined sales of the five transactions represent $60-million a year.

Purchase price was not revealed, but it involved cash, common stock and a share in future earnings.

In addition to electric generators, Onan makes power plants for emergency and marine use, some gasoline and diesel engines, truck cab air conditioner components, and some microwave communication system components. Company had sales of $14,941,000 and pretax net income of $1,945,000 in 1959. It will be run by its present management as a Studebaker division.

Material Change Results in Dramatic Cost Reduction

A change to an unusual combination of dissimilar materials has resulted in reduction of 25% in assembly costs alone in the manufacture of a wheel and shaft assembly used in a diesel engine turbocharger.

The new design features a mild steel shaft brazed to a wheel cast of cobalt-chrome-nickel stainless alloy. Stainless Processing Division of Wall Colmonoy Corporation engineers developed the idea despite considerable skepticism regarding the chances for success because of dissimilarity of the metals. High in Priority requirements were temperature corrosion resistance in the wheel. Component is exposed to hot, corrosive gases in service.

Burlington Road Buying 36 Diesels

Chicago, Burlington & Quincy Railroad will buy 36 diesel locomotives in 1961. They will be new GP-20's produced by Electro Motive division of General Motors Corp. They are capable of hauling 100-car, 4500-ton trains at speeds up to 60 mph.

1385 freight cars are also in the order which amounts to $22,250,000. Most of the new cars will be specially designed to avoid freight damage and permit ease of loading and unloading.

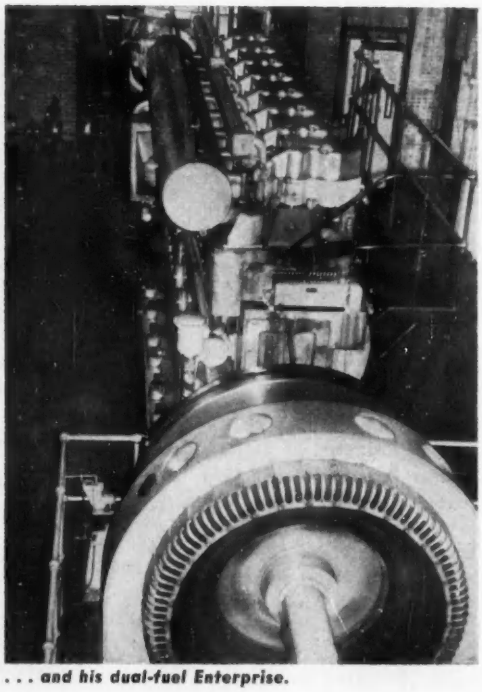
The 1961 rolling stock budget of the Burlington Road is the largest since $24,100,000 was laid out in 1957, reflecting the company's belief that the long-term economic outlook is one of growth.

Diesels for Bangkok Water Works

The Thailand government's ordering five 1000-kw portable diesel engine generator sets for operation of municipal water works at Bangkok. The units consist of GM model 16-278A diesel engines; GM Electro-Motive Division 3-phase, 50-cycle, 3500-v generators; Purolator filters and strainers; Harrison lube oil coolers; Young shell-and-tube jacket water coolers; GE component switch gear. All were rebuilt, supplied by A. G. Schoonmaker.

Today's Diesel Man

Dieselman Harry Monsell . . .



. . . and his dual-fuel Enterprise.

We drove out to the Eastern Tip of Long Island last month to meet Harry Monsell, one of the oldest municipal power plant superintendents in the country. He's been a power plant man since he was 18—1960 marks his 48th year with the Greenport municipal power plant, one of the country's first electric generating systems, in continuous operation since 1887.

Greenport faces on Long Island Sound—in fact, is surrounded on three sides by the sea. Most of the village men work on the water, fishing and scalloping, others find work on land in a clam chowder plant or at the local fish processing freezer. Outside of town, the sandy soil is given over to raising potatoes and pungent-smelling cauliflower. Big diesel flatbottom trucks were seen out on the highways leading to town, heavily loaded with bulging burlap bagsful of famous Long Island potatoes.

"Chief Engineer . . . Superintendent of Utilities"

We found Harry Monsell in the basement of the Village Hall, sitting at one of his two desks. (Other is three miles "down west" at the power plant.)

Harry has a full head of snowy white hair . . . his face is weathered and ruddy and his eyes squint pleasantly at you from behind steel rim glasses.

There's an easy-going authority about Harry, an authority that belies the numerous man-killing responsibilities that are part-and-parcel of his job. Ask him his title and he'll smile, mumbling something about "Chief Engineer . . . Superintendent of Utilities and Public Works." Press him further, and he'll admit that the municipal power plant, the water works, the sewer system, the city streets and even public docks all come under his wing!

"Everytime they gave me a raise, they looked around for something more for me to do," he said smiling, speaking slowly in the broad a's of his New England accent, obviously pleased to reminisce back over the years. "All my people followed the water," he told us. "And from the time I could walk I was on the water, too. But somewhere along the line, working in the boats

Henry H. Tuthill
Town Supervisor

Harry Monsell is the man responsible for the operation of Greenport's whole utility system—and that includes our electricity, our water, our sewers, our streets as well as public moorings! He's grown up with it . . . pioneered much of the construction . . . knows intimately the history of everything. He's a man whose decisions we respect . . . whose judgment we have come to rely on. He'll be very hard to replace.

I guess, I got interested in engines—they were for the most part steam then. So on the 15th of July, 1912, when I was 18 I came ashore and went to work in Greenport's steam electric generating plant, as a fireman. I worked up to chief operator . . . and when I was resting I went out and did line work. In 1919 they made me Superintendent."

Books From England . . .

Harry got interested in diesels early—'way back in 1922. "I figured being a small plant it was our only salvation." Harry had a friend on a local yacht that made frequent trips back-and-forth to England. The friend brought Harry the latest diesel books from England—and he learned what was going on in Europe, especially in Switzerland. "I figured it out for our operation here—and told the Village I could pay for the change-over from steam to diesel by the savings in coal. I began traveling around the Eastcoast to see all the diesels—I talked diesels morning, noon and night to everybody."

Finally Harry got his diesel. The year was 1927. His first diesel? A 300-kw, 4-cyl air injection Busch-Sulzer. Two years later, the savings allowed Harry to buy a second diesel—this one was a 419-kw, 6-cyl Busch-Sulzer. And three years later it was time for a third diesel— a 750-kw, 8-cyl solid injection McIntosh & Seymour.

In 1941 Harry got himself a 1000-kw Model 37 Fairbanks-Morse diesel. And then finally came their new Enterprise 1250-kw dual fuel in '57.

"We're running the only engine on whole of Long Island that generates electricity for sale with gas!" said Harry proudly. "We generate some 10-million kw's a year, 6½-million of which are distributed to Greenport, 3-million through the under sea cables to Shelter Island. Over 1000 meters, 200 industrial meters on the line. And most of it's generated with our new Enterprise—nearly 80%, I'd say. With the Enterprise giving us 14½-kw per gallon of fuel and just about as good on gas—why, sir, we can't afford to run anything else! It costs us 1½ cent per kw to put in on the busbar last year—and I'll tell you we couldn't begin to buy outside power for that price."

"Down West" To The Plant . . .

Harry Monsell glanced at his watch. "Supposing we take a ride 'down west' to the plant," he said.

Slowly in second gear we drove through the Village streets, Harry pointing out one of his six sewer pumping stations. "Use Fairbanks-Morse 220 volt, 5210-hp electric motors. We're pretty flat here—but gives us no trouble. 'Cept once in while a tickle fish or two get caught in the impellers." A pause and then: "Hurricane of '38 really raised hell hereabouts. Lost over 700 poles, lost all our big elms and when they blew over they ripped sewer pipes with 'em! We had to string ropes between the buildings with insulators on 'em. Had transformers set up on the sidewalks for a week 10 days."

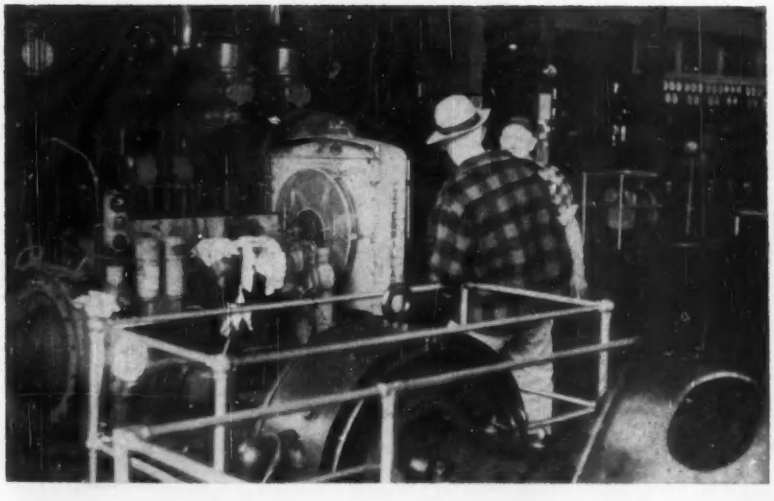
Outside the city the old Dodge pickup shifted into high . . . and then suddenly swung off the highway. "Want to see our waterworks?" Harry asked. "We got 10 wells and three pumping stations. We're using 4-cyl Cat 3400 diesels driving F-M turbine pumps at two of 'em. Just converted one station over from a Chrysler gasoline engine. Got our Cats from H. O. Penn."

Harry pulled into Greenport's power plant yard and shut off the engine. Outside you could hear the hum from the plant. Taking us on a quick tour, Harry pointed out the old steam plant chimney that blew over in the '38 hurricane . . . showed us his cooling towers . . . the four fuel storage tanks with a 58,000 capacity . . . the outside air intakes . . . exhaust silencers . . . and the exhaust-heated steam boiler for heating the plant. Then we went inside to inspect the Enterprise.

Hour Meter Tells the Story . . .

"Just take a look at the hour meter—that tells the story. Almost 27-thousand hours on her—and that's only a few hundred short of continuous operation! She's shutdown every Monday morning for regular PM

(*Continued on page 21*)



Down at the plant, Harry, back to camera, talks to one of his men busy rebuilding Cat diesel used to pump water for city of Greenport, L. I., N. Y.

SIMPLICITY
in the Heart of the Modern Diesel Engine

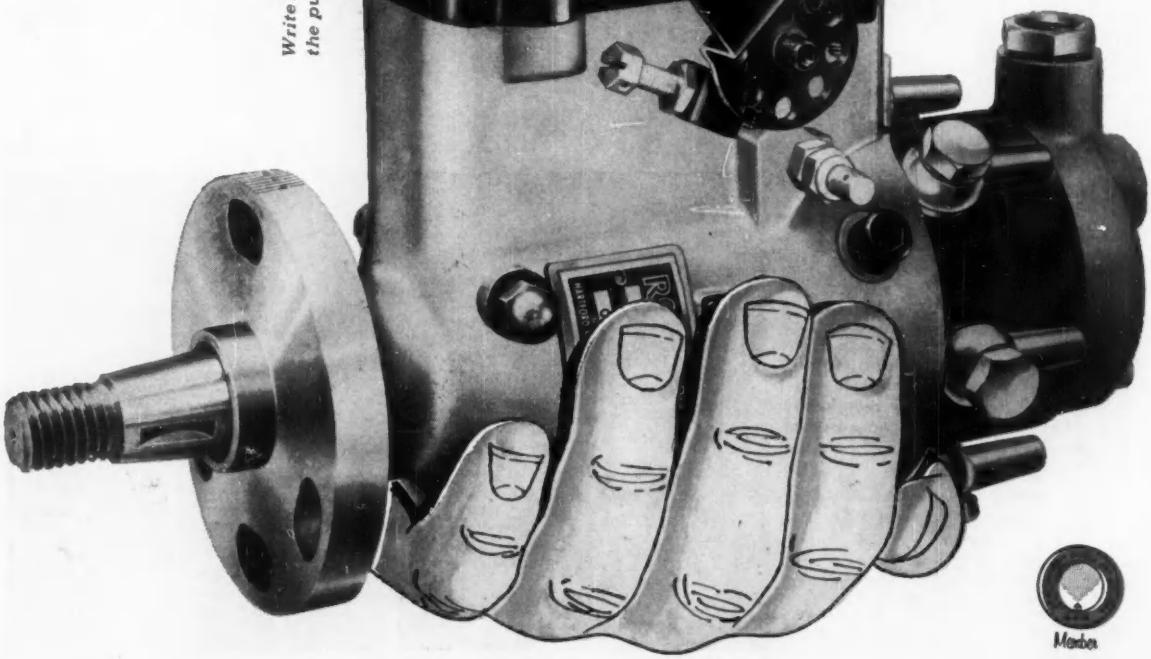
Simple—Only 8" long, 3¼" wide, 5½" high . . . weighs less than 10 pounds . . . fewer parts to service, fewer adjustments to make.

Versatile—Because of accessories that can be built in or added at low cost taking up no, or very little, valuable engine block space.

Economical—Initial cost is less, costs less to service, saves money because of its dependable service.

HMS makes good diesels better

ROOSA MASTER



Write for guides to better fuel injection. One features the pump, the other an efficient, economical filter.

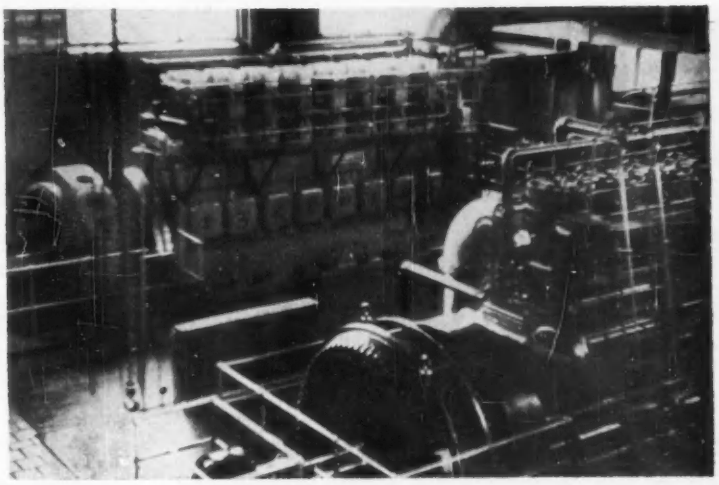
HARTFORD MACHINE SCREW CO., HARTFORD 2, CONN.
Division of Standard Screw Company

Member

For more information write in No. 316

Today's Diesel Man . . .

(Continued from page 19)



Two of Greenport municipal power plant's six engines—in foreground is 1000-kw Fairbanks-Morse, background is the 1250-kw Enterprise that carries 80% of load.

checkup. We look at her crankcase, of course, to see what's down there, how the bearings are holding up. We dial-check the throw of the crank . . . check circulating water system . . . run a wire brush in heat exchanger water jacket tubes. Oh, everything gets a pretty good looking over. Afterall she's running over 7000 hours a year for us."

After a tour of the basement where we saw the Hilco oil reclaimer set-up for the F-M engine . . . and the giant gas meter that supplies gas to the Enterprise, we went into Harry's generous-sized glassed-in office. And there, among his growing gun collection, we sat down and talked some more.

We learned that Harry is a member of the American Waterworks Association, helped start the Municipal Electric Utilities Association . . . is a member of the Long Island Water Conference, and Sewer Works Association . . . has attended various special schools around the country. We also learned something about how he goes about getting the equipment he wants.

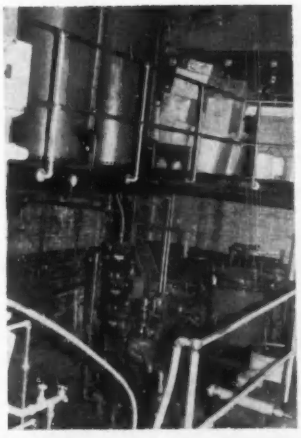
"I've never understood politics," Harry told us. "But I've worked out a pretty good system to deal with the politicians. I've always decided what I wanted, decided exactly what I needed to do the job . . . then I wrote up my specifications around the item. Usually they just didn't have any choice but to give it to me!"

Harry also had some sage advice for future Supers. "Keep your men happy," he said. "Listen to their troubles—sometimes you agree with them most of the time you don't.

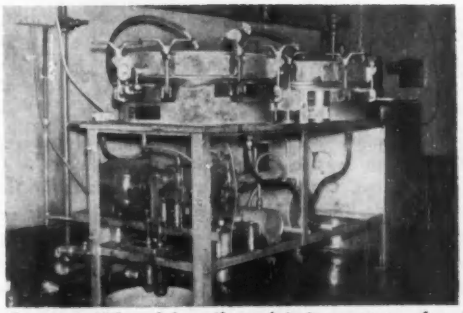
"In my job you're hired to work 24 hours a day—longer if necessary. And it's been my experience that men will come out any hour of day-or-night if you're willing to come out yourself. When you have good help, they don't mind coming down after supper, 'stead of taking their wives to the show."

We asked Harry about the future of the municipal power plant. "Well, the trend is toward giant power, that's for sure. Us small plants probably won't be able to justify ourselves too much longer. We'll have to tie into the highline and buy power someday soon. Atomic power, water power, high pressure steam—they're all going that way now. It'll still, of course, be more economical for us small plants to do the distributing. But that's all in the future, yet—right now we're still generating it with diesels cheaper than we could buy it for!"

Through the plate glass windows we watched the plant chief operator and his helper starting up the old Busch-Sulzer, purchased back in 1929. Harry Monsell walked to the door, opened it, and cocked an ear appraisingly. "She don't sound too bad for 30 years, does she?"



Greenport's lube oil reclaiming set-up includes settling-out tanks (top left) and centrifuge (lower center) plus a vaporizer and purifier (right).



Compact Hilco lube oil reclaiming set-up for Fairbanks-Morse engine is located in basement of power plant.

Furniture Transport's William Contaxis

Interview:

Furniture Hauler Switches to Diesels

Volvo L-488 tractors cut fuel consumption and servicing time for this lightload-shorthaul trucker.

"Sweetest rig I ever handled," said the driver as he stepped down from the Volvo-powered furniture van. "We've got two others just like this one. Tell you the truth, don't know how we ever got along without 'em!"

The "we" he was referring to is Furniture Transport Co., Inc., in West Haven, Connecticut, transporters of new furniture. A normal shipping day may include a trip from a factory to a wholesaler, another from a wholesaler to a retailer, and possibly even a retailer to a customer. A geneal description would be short-haul, light-load trucking.

A general description of Furniture Transport's equipment? They're running Volvo's medium-to-heavy duty tractors, the L-485 (recently redesignatad the L-488). It's got a 6-cyl, 4-cycle Volvo diesel under the hood. This 411-cu in. engine develops 125 hp at 2400 rpm (289 lb ft torque at 1200 rpm). Fuel system is direct-injection and it's by CAV. Compression ratio for the L-488 is 17:1. It's got a 5-speed synchronized transmission . . . it's also equipped with an exhaust brake to help out the service brakes. Volvo offers this tractor in five different wheelbases—134-in., 150-in., 173-in., 189-in. and 205-in.

At the main office of Furniture Transport Co., the man who orders the equipment, checks the reports and pays the bills is Mr. William Contaxis. After a few minutes of conversation to explain what DIESEL POWER was after it became simply "Bill."

"Bill, what kind of operation do your trucks get?"

"We're short haul; but we pile up quite a lot of mileage. We do a lot of turnpike, but we also have a lot of stop-and-go. Traffic lights, too. Some of our deliveries are in congested traffic situations. For example, we deliver to Macy's, in the heart of New York City."

"I see several gasoline units and three new diesel tractors outside. Why did you buy the diesels?"

"First, of course, we're always replacing worn-out equipment. Generally, five years is the limit on any one piece. After that we make it a yard piece.

"I thought of replacing retired tractors with new diesels because of our operating costs. Fuel and tune-up costs were getting just a bit too high. I was willing to swap a lot of upkeep for a little more initial cost."

"How do the Volvo L-488's fit in?"

"One of the diesels gets about 2700 miles a week between here and our Buffalo, New York, terminal. The other two run between New Haven-Philadephia-Baltimore-Washington. If we can, we use them on local deliveries, too. Naturally, we run the gasoline rigs, too. We still have ten of them."

"What's the maintenance picture look like now?"

"Well, we've got two pictures to look at, the gasoline tractors and the diesels. Incidentally, we farm out our maintenance, so we know its exact cost to us, overhead and all.

"The gasoline jobs have to go in for some service each week or after every long trip. Generally, they need a tune-up, often points and condenser and sometimes spark plugs. Usually, something else has to be repaired or replaced. We've made it a policy, whenever possible, to keep the engines current, adding improvements as they become available. Average out-of-service time is three to four hours per week. We've also found after 40,000 miles or so a gasoline engine starts to get tired.

"We've only had our diesels for about 70,000 miles,

but in that time the *biggest* item on our maintenance budget is washing and greasing! These items have cost more than the repairs. Average out of-service time for the diesels is about two and a half hours per week. Depending on use, the diesels go in for service weekly or every other week."

"Specifically, why did you buy this particular tractor, the Volvo L-488?"

"Many reasons. First, despite the gasoline-diesel initial cost differential, I was right at the point of ordering two big diesels—that is, bigger than I needed. It's hard to find a tractor in our size. Furniture is bulky, but not very heavy. Our gross weight is only 26,000. Volvo offered me the correct, complete unit, ready to drive away.

". . . these L-488's are just our size, and on the basis of their performance record we're replacing our gasoline trucks, one by one, with Volvos!"

"Second was the price. Bill Berluti at Connecticut Truck Distributors in New Haven offered me the L-488 at a price that was competitive with a gasoline rig. The difference between gasoline and diesel was only $2000 or so."

"Was this what made you decide?"

"Hardly. You're forgetting about parts availability and factory service. The parts do come from Sweden. In spite of how attractive the proposition looked, without adequate parts and service the Volvos would have been a bad investment."

"Then what made you decide?"

"I spent a whole day wandering around the Parts and Service depot in Newark, New Jersey. I saw enough parts to build maybe a hundred rigs like mine. I also saw my rig sitting there, already fitted with the small American 9.00 x 20 tires that I wanted. I measured up the fifth wheel and as it sat, it mated perfectly with my Trailmobiles.

"I then had a factory rep come up to talk to me. He seemed reluctant to write up my order because he didn't think I'd given it enough consideration. I had to tell him I'd been down to Newark to put him at ease."

"Parts in Newark are one thing. How about a breakdown on the road?"

"First, many of the parts on the tractor are actually manufactured here in America. In fact, they tell me that about a third of the cost of a Volvo is represented by American parts—and this means, of course, that a third of the cost goes back into American pockets. People at Newark told me that American-made replacement parts are shipped to over 43 countries around the world by AB Volvo! For instance, fifth wheel is Austin, tanks are Snyder, 2-speed axles are Eaton. Air brakes are Bendix-Westinghouse's, propeller shafts are Spicers, steering gears are by Ross. Wheels are Dayton spoke . . . with Firestone Rims. Your tires are US-made. And as for the clutch, it's a dry-single plate by Berg & Beck. Rear view mirrors and the pogo stick—they're all American-made! So you can see, road breakdowns aren't the problem you'd suppose. And, what's more, Volvo has an excellent round-the-clock breakdown service.

"Road breakdowns are handled by phone. The factory has a service jeep they'll send up to a hundred miles. Further than that, if they're needed they'll fly out."

"How much service have you needed, to date, and what has been your experience?"

"When I took delivery on the first L-488, a rep came up to check out my drivers. That man knew every nut and bolt in the truck.

"Another time something came up—I don't even remember what it was anymore. We called Newark on a Saturday afternoon and got their answering service. That same evening I got a phone call at home from the service rep. He took care of our problems by phone."

"Is there a difference in unit productivity between gasoline and diesel?"

"Trip times are about the same, but the diesels spend less time in the shop. Drivers are less tired, too, and this is a factor."

"Good point. What do the drivers think of the L-488 diesels?"

"They swear by 'em! That truck was built as if the designer had been a driver. It rides like a passenger car . . . the engine doesn't vibrate, and there's practically no noise. At 65 mph you can hold a normal conversation in the cab.

"Also, it's the little things. The cab is very roomy. The handbrake is a real emergency brake that you can throw without being afraid, and the clutch linkage is levered so it doesn't require much pressure. Steering is easy, too. The heater directs the main air stream over the driver's feet. Storage pockets are right where the drivers want them. Windows are lever-operated, with half a turn from full up to full down. Generally, it's just easier to drive."

(*Continued on Page 38*)

Lloyd Ferrin, up in the cab of Interstate Motor Lines' Peterbilt tractor, talks with IML Fleet Maintenance Supervisor, Lon Adair. "Retarder saves brakes and brake drums—we've been dropping off Donner Summit with 40,000-lb loads and not braking at all!" says Adair.

RETARDERS for stopping power

Retarders have much to offer operators of today's heavy on- and off-highway vehicles—added safety, smooth deceleration, positive control of down-hill speeds, all independent of the service brakes. Here are details of one practical retarding system and what it can do for you.

"Came down smooth and easy at 15 mph instead of 5 mph . . . hardly touched the service brakes. Drums were cool at the bottom of the drop. Gives you a nice, safe feeling on these mountain runs." This is a typical driver comment heard at Interstate Motor Lines, Inc., Salt Lake City, Utah. This line, handling freight and general merchandise between Salt Lake City, Portland, Oregon, San Francisco and Los Angeles, Calif., Denver, Colorado, Kansas City, Mo., and Chicago, Ill., hits some rough country including Loveland and Donner Passes.

Talk to the mechanical supervisor and he'll tell you another side of the story—brake and drum repair and replacement has been cut to a fraction of what it was. He'll also tell you that engine maintenance has been reduced. Talk to operating people and they'll praise the speedup of schedules made possible and also reduction in cargo damage claims resulting from the smooth, controlled slowdowns and stops.

Obviously, something new has been added. It's the hydraulic retarder built by Thompson Products Michigan Div., Thompson Ramo Wooldridge, Inc. Installed in the driveline, this is a hydraulic torque-absorbing device under complete control of the operator. Under most conditions, it will do all the major braking, leaving service brakes only for final stopping.

What's This Retarder?

It's a hydraulic device capable of absorbing a surprising amount of torque (horsepower when you consider its driven speed). Thompson builds two types—one that mounts directly on the axle and one for midship mounting. Axle-mounted models fit Timkin tandem axles SQDD, SRDD, SFDD and Mack tandems CRD-92 and CRD-95 models. They are mounted behind the axles as an extension of the pinion shaft. For front-carrier type axles, the midmount retarder is used.

The units are small. For example the axle-mount retarder has an overall diameter under 17.5 inches and an approximate 8.5-in. length. The midmount package has a 16.6-in. overall diameter and a flange-to-flange length of 13.5 inches. These flanges, part of the retarder, are supplied to fit Spicer U-joints Nos. 1600, 1700 and 1800 plus Borg Warner's Mechanics 7C, 8C and 9C models.

Both retarder models are built primarily of aluminum castings. A double circuit impeller or pump is mounted on through-shaft of the midmount unit and a single one on the shaft driven by the pinion in the axle-mounted units. Stationary blading is in the housing. Torque reaction on this blading is absorbed by the

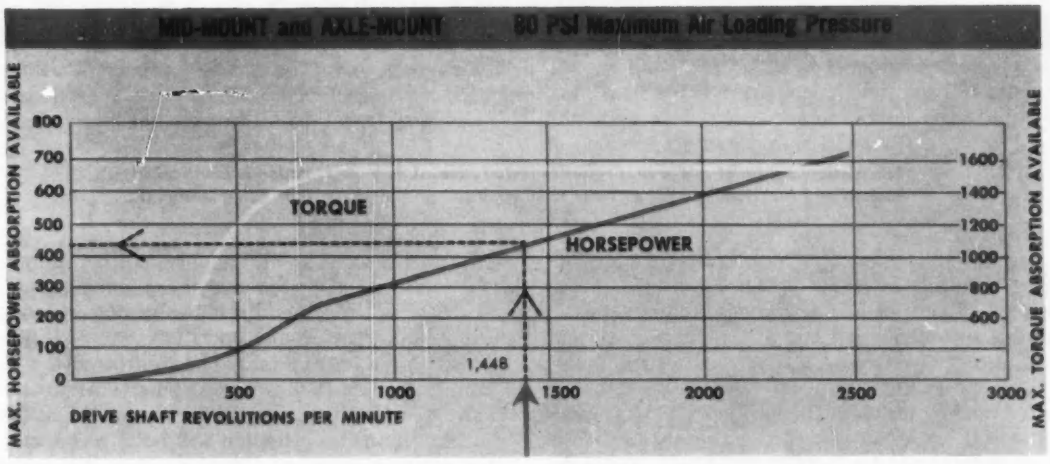
chassis-anchored mount that holds the housing in midmount installations and by the axle in the axle-mount version.

During retardation, the vehicle's turning driveline powers the impeller. The fluid circuit is torodial as found in fluid couplings and torque converters. Power input is absorbed by the impeller as it accelerates the working fluid. Fluid leaving the impeller's outer diameter is directed against the stationary element where it is "slowed down" (it's energy absorbed) and it is directed for re-entry into the impeller at it's inner circuit diameter.

Here's how it works . . .

First, what are we working *with*. Working fluid is a Type C oil combined with some air. For this reason, oil must meet certain specifications including a somewhat modified bench oxidation test for Type C fluids. Several readily-available commercial Type C fluids are recommended by Thompson. SAE 10 engine oil can be used for limited periods. However, retarder performance will be impaired and continued use will result in retarder damage due to higher operating temperatures.

Now refer to the schematic drawing. While this is specific to the midmount retarder, axle-mounted ver-



Power absorbed in the retarder is converted to heat in the working fluid. This necessitates a heat exchanger to keep fluid temperature at acceptable levels. Engine cooling water is used for this purpose. Significantly, heat input to the engine cooling system only occurs when the engine is rejecting a minimum amount of heat to the system as during fuel cutoff on long downhill grades.

Actually, this heat input helps maintain engine temperatures on down-grades. This explains IML's comments on reduced engine maintenance as it is during this period of operation that engines tend to overcool. This promotes lube oil sludging and accelerated low-temperature deposit formations. Close-to-normal temperatures eliminate this and also help when the engine is called upon to pull again.

Retarding effect must be selective from an absolute minimum effect during normal operation to maximum braking effect. This is done by varying the amount of working fluid in the system. A loading cylinder, actuated by a single driver control, handles this function.

Varying the amount of fluid in a system implies need for an adequate fluid supply. To those familiar with hydraulic circuits, alternate charging and dumping suggests air-bleed problems. Thompson handles this with a reservoir tank connected to the system by a fluid line and air line.

These, with the controls, are the major components of the system and . . .

What Speed with Safety Down a Given Grade With a Given Load?

Start with two basic formulas . . .

$$\text{Drive Shaft RPM} = \frac{\text{Desired Speed of Descent} \times \text{Axle Ratio} \times 168}{\text{Tire Rolling Radius, inches}}$$

$$\text{Braking HP Needed} = \frac{\text{Desired Speed of Descent} \times \text{GVW} \times \text{\% Grade—1.5\%}}{375}$$

Now for a specific case . . .

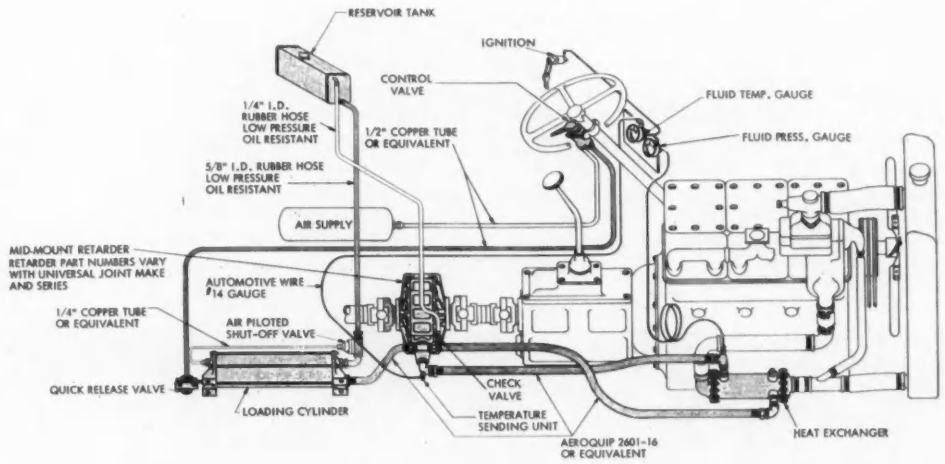
Conditions: Desired Speed of Descent—25 mph; Axle Ratio—7.32; Tires—11.00 x 22 (effective rolling radius—21.24 in.); Load—76,000 GCW; Grade —8%.

Now, by substitution, we get . . .

$$\text{Drive Shaft RPM} = \frac{25\ (7.32)\ (168)}{21.24} = 1448$$

$$\text{Braking HP Needed} = \frac{25\ (76{,}000)\ (.065)}{375} = 329$$

Entering the chart at 1448 driveshaft RPM, go up to the HP curve and then left to find 425 Retarder HP available. This exceeds the 329 Braking Horsepower required so retarder will control the vehicle unassisted. If this were not the case, desired descent speed could be lowered or a percentage of service brake use accepted. Radiator capacity must also be considered. Roughly, if braking horsepower needed exceeds the engine's horsepower, a lower descent speed or supplementary service brake use must be accepted to avoid excessive fluid temperature.



Schematic diagram of mid-mount retarder installation. Axle-mount version is identical in hookup and functioning, only retarder unit, its location and piping runs being different.

sion operates the same way. Note that truck's air supply tank connects to driver's control valve on wheel. Movement of control handle through its arc regulates amount of air entering left end of loading cylinder and controls degree of retarding.

Let's start with the control valve off . . . no retarding. There's a floating piston in the loading cylinder, spring-loaded to the left or air side. The piston's right side is open to the working fluid. With the air off, and pressure relieved by the quick-release valve, the piston moves to the left, increasing capacity of the hydraulic circuit. The retarder, always acting as a pump, can now pump the working fluid out of its torus and into this added space.

Note the copper tube connecting the cylinder's air side to the air-operated shutoff valve. With no air pressure, this valve is open. Any excess fluid in the circuit can flow to the reservoir.

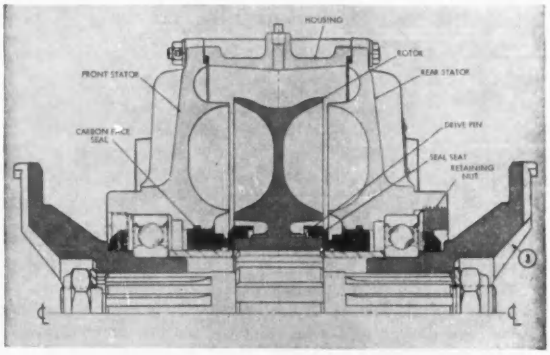
Note also the air line from the top of the reservoir tank to the retarder's inlet connection. At this point there's a downward-opening check valve. This permits air to enter through the double-branched entrance to the retarder's inlet. Some slight amount of oil enters with the air, this air-oil mixture serving as lubrication during normal vehicular operation.

Now we want to retard. The control valve is moved, admitting air to the loading cylinder. This shuts off the valve, blocking fluid flow to the reservoir. Piston movement against spring tension will be in accordance with the amount of air admitted. An equilibrium will be reached at any valve position. Piston movement to the right forces fluid into the retarder's inlet. Pressure closes the air-line check valve. The hydraulic system is now a closed circuit.

The retarder's impeller, turning as part of the drive line, encounters an opposing torque as a function of the amount of working fluid in the torus and speed. Oil spilled from the torus flows to the heat exchanger for cooling and then is returned to the toroid's center.

Installation of the heat exchanger is arranged to provide counter-flow of the fluid and cooling water for maximum cooling effect. Also, water piping is arranged so that the exchanger is in the bypass flow around the engine thermostat. This insures cooling of the retarder fluid even if the engine's water is not up to temperature and the thermostat closed.

A temperature and pressure gauge complete the installation. Location of the senders is seen on the drawing. Maximum temperature for continued operation is 275°F with 325°F permissible for short emergency periods. The pressure gauge is principally used as an indication of the degree of retardation being used. Pressures of up to 120 are shown.



Mid-mount retarder has double toroidal fluid circuits. Rotor is driven by shaft connected in driveline by integral U-joint flanges (3).

Make the system foolproof!

This was the mandate to Thompson engineers and it referred to operation, installation and servicing. Let's see what was done.

Operation was reduced to simple, one-lever control. Investigation determined that a majority of drivers preferred a hand lever mounted at the wheel. Retard-

ing effect follows lever position throughout its quadrant. An adjustable friction plate holds lever position once it's set.

Realizing that most installations would be made in the field, retarders and their associated parts come as complete kits. The only additional items are hoses, tubing and fittings—all items commonly available in distributor or fleet shops. Full instructions accompany the kits.

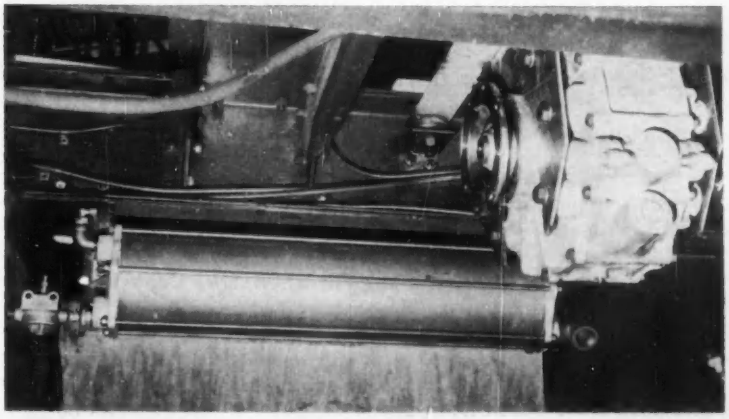
Mid-mount retarders pose the problem of a suitable support attached to the chassis. Drawings of these, suitable for common truck types, are available. Any good shop should have no difficulty.

Routine servicing consists of seeing that the reservoir tank is about half-full . . . it's not at all critical. This reservoir tank has the added advantage of making the system self-compensating—for altitude as an example. It solved the problems of making the system self-bleeding and maintaining a suitable oil-air ratio in the working fluid.

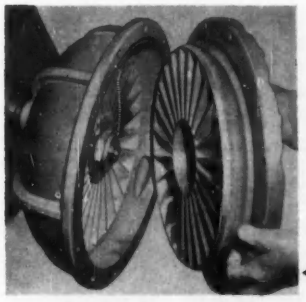
Why retarders at all?

Both on- and off-highway trucks and construction equipment are getting bigger, their loads heavier. When you're grossing 80,000 lb and up, it takes a lot of horsepower to stop. Wheel sizes and running gear limit the space available for bigger brakes. They're about up to the limits now and to fight the big enemy —heat—we're getting into bi-metallic drums and other devices for better heat dissipation. In some big logging trucks they carry water to spray on the drums! Retarders can do the job better.

Ability to stop . . . for safety of both men and machine . . . is a primary consideration. Coupled to this are economic factors that far offset the cost of effective retarding equipment. Higher controlled downhill speeds mean greater productivity, faster work cycles. Savings in service brake and drum replacement costs alone can pay for the equipment in a year or less. Smoother deceleration, more even engine temperatures—both have economic effects.



Mid-mount retarder is held by chassis-mounted support bracket. Here, loading cylinder is also bracket-mounted to chassis.

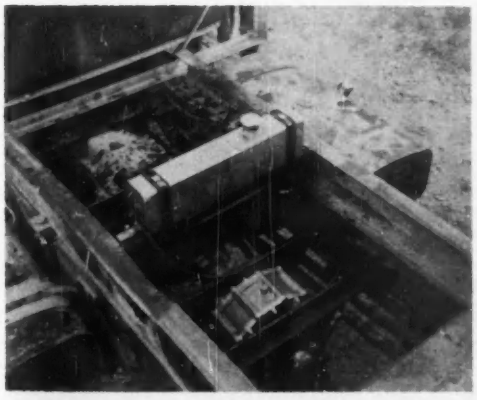


Axle-mount retarder bolts directly to axle, left. Rotor, left, is driven through pinion. Stator, showing blading, is being attached.

Comments on a test ride . . .

Detroit streets and the Expressway are no places to see the full effect of the retarder but they give some idea of its operation. Test vehicle was a Cummins-powered Autocar tractor without a trailer load. Operating in busy streets with a good flow of traffic, smooth, rapid response was obtained. Service brakes were used only to come to a full stop. Fluid pressure recorded rarely exceeded 15-20 psi, indicating the tremendous retarding reserve.

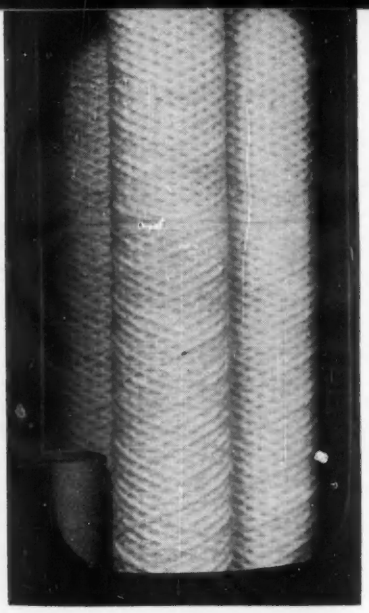
A more graphic idea of the power absorbtion capability of the retarder was obtained on the Expressway. Here, the absence of a trailer load made it more impressive. Speed was dropped to 8-10 mph and the Fuller transmission put into second-direct. In this gear with the accelerator right on the floor, maximum speed obtained with full engine torque pulling against the retarder was about 12 mph! In a higher gear the engine would have stalled.



Another mid-mount installation, showing one reservoir location and mounting.

For both on and off-highway equipment, there's a lot to be said for retarders. Many US truckers have already installed them . . . and we'll be seeing more of them in the near future!

PRODUCT REPORT:



Cuno's "Micro-Wynd" Filter Element

Design and construction features of new cotton-cellulose cartridge for micronic filtration of fuels and lubes.

Cuno's new filter element for cleaning both fuels and lubes has some interesting and practical features. A wound cotton-cellulose filter element, it is designed for micronic filtration in depth at low pressure drop and with high dirt holding capacity. Since wound-type filter elements are not new, we asked Cuno's engineers and laboratory personnel for a fill-in on what they had done to produce something they consider a radical improvement over similar cartridges.

Cartridge Strength is Important . . .

Micro-Wynd filter construction starts with a perforated metal core. Cellulose yarn under uniform high tension is helically wound on this core back and forth in successive layers. Actual filtering medium is a blanket of cotton fibers applied continuously as the cellulose yarn matrix is being wound. Finished element is structurally strong and resists deformation under unusually tough operating pressure conditions. This body strength is imperative in modern high-pressure lubrication systems, particularly when oil is cold or when cartridges are nearing their full dirt load. Another structural advantage claimed by the manufacturer is squareness of element ends which permits end-to-end assembly in multi-element housings without intermediate sealing devices.

Fine Filtration, Dirt Capacity Important Too . . .

Cuno pointed out that while their element might look like other wound types, their independently applied matrix and fiber blanket offer significant operating advantages, specially in the finer density range.

Their unique method of applying a fiber blanket achieves complete coverage of each diamond-shaped fluid path. Fibers are woven in and out of the matrix and are securely locked in place by succeeding w i n d s, completely eliminating channeling at high operating pressure.

Individually wrapped and sealed in cellophane . . . 10 to 75 microns.

Since the fiber blanket does the filtering, the helical spacing of the winding remains constant regardless of rated density. The density of the blanket itself is increased to achieve finer filtration. This means that the dirt holding capacity of Micro-Wynd elements with different micron ratings remains virtually the same.

Suitable for Any System . . .

Micro-Wynd elements are made in standard size, 1-in. ID by 2½-in. OD by 9⅞-in. length, to fit Cuno and other filter housings. By selection of the proper Micro-Wynd element and the number used, the flow rate and system pressure drop can be adjusted for any filtration arrangement—full flow, bypass, or shunt. Available micron densities are 10, 25, 50, and 75.

Cuno reports rigid quality control of the fiber blanket and matrix yarn to insure product uniformity. Fibers are clean and free from extraneous materials. No chemical treatment is used. Micro-Wynd filter elements will not remove additives in heavy-duty oils and are thus suitable for a wide variety of applications.

Want minimum maintenance on a dual-fuel engine? —STANODIESEL Oil M

Stafford, Kansas Light Plant finds this lubricant helps hold down maintenance and operating expense

Bill Ray, (left), Standard Oil lubrication specialist calls on Stafford city superintendent LeRoy Priess. Rendering technical assistance to customers such as this is Bill's job. He is qualified for it through seven years' service with Standard Oil Company. Bill is a graduate of Wichita University.

Quick facts about
STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.

From February, 1953 to April, 1959 a 1,280 hp., 720 rpm., dual-fuel engine at the Stafford, Kansas Municipal Light Plant generated more than 12.5 million kilowatt hours in 29,780 hours of operation. At the end of this period the top piston rings were replaced; however, the amount of wear was almost too small to measure. Rings, pistons and cylinder walls showed only a negligible amount of carbon and varnish. Lube oil consumption was 7,399 gallons or 1,697 kw. hours per gallon.

You can get this kind of service with STANODIESEL Oil M. The oil's superior base stock, coupled with its additives gives you these maintenance and operating savings: low oil consumption, reduced port deposits, fewer stuck rings, less need for ring replacements, less cylinder wear, lower filtration costs and fewer bearing problems.

Learn more about STANODIESEL Oil M. Call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

STANDARD

You expect more from STANDARD and you get it!

Piston after 29,780 hours. Virtually no carbon deposits or varnish are visible.

For more information write in No. 317

DEUTZ'S U.S. MARKETING PLANS

Deutz sales manager, Werner Schmitz.

Diesel Energy Corp. builds firm future for aircooled Deutz here

Last month, Bros Inc. of Minneapolis, Minnesota, shipped one of their VP9D vibratory rollers into the State of Utah. It had a Deutz aircooled diesel aboard . . .

There was no question that parts and service for the Deutz prime mover would be availat'. and in terms of what is expected by the construction industry. Bros, like all of Deutz's customers, had advised Diesel Energy Corporation in New York, the U.S. su' sidiary of Deutz (Kloeckner-Humboldt-Deutz AG., Cologne, Germany) of the sale by the standard OEM Shipping Notice. Now, service organization went to work, providing for initial servicing and operator's instruction at the point of destination.

Introducing Diesel Energy Corp.

Diesel Energy Corp. became the second US subsidiary of Deutz about six years ago, a long time after Deutz engines had been built in Philadelphia by Schleicher, Schumm & Co. before the turn of the century.

Deutz, today one of the world's leading diesel engine manufacturers, was founded in 1864 by N. A. Otto, the father of the internal combustion engine, and Eugen Langen. Deutz has always been very export-conscious, (present export sales amount to more than 42% of production), shipments going to every country of the Free World.

Deutz realized that the task of marketing it's products, and specifically the aircooled diesel engine, in America called for a dynamic organization and a specialized staff, quite different from that of the average importer.

Diesel Energy's own personnel comprises regional representatives, and factory field service engineers. Their New York staff is convinced that they can only secure their modest share in the highly competitive diesel market by offering a product of proven and not-quite-conventional merits and by gaining the customer's confidence through technical assistance and first-class service.

3000 Deutz Diesels Sold . . . .

Sales figures and the increasing number of satisfied customers are proving the approach successful. About 3000 aircooled Deutz diesels have been bought by users in this country.

Deutz has become a familiar prime mover in mining (complete line of Deutz aircooled diesels has been approved by the U.S. Bureau of Mines) . . . in irrigation

Deutz air-cooled A2L514 powers Bros Vibratory rollers.

. . . construction and in the marine field. Diesel Energy's distributor and dealer organization effectively covers most of the 50 States of the Union but the people at DEC do not consider it perfect. They state quite frankly that they are working continuously to set up new dealers and/or distributors in territories not yet sufficiently covered. "Of course, those dealers would have to feel the same way about quality products and the importance of service as we do."

Assistance to Dealers Important . . . .

The majority of the present dealers are fairly small organizations and this, DEC feels, can work to the customer's benefit. Experience has shown that compact dealer organizations tend to be flexible . . . better able to tailor their set-up to meet the particular needs of their customers. "And, of course, you can't discount the fact that in your smaller dealerships the boss isn't one bit reluctant to roll up his sleeves when a problem comes up. And not only during business hours. Incidentally—and this should not be overlooked—these smaller outfits have the necessary pioneering spirit to take on a new line."

When they take on a new dealership, one of Deutz's traveling Field Service Engineers pays a visit. They spend a reasonable amount of time, familiarize the dealer thoroughly with the product, help set-up service procedures . . . taking the dealer's mechanic to nearby installations and preparing the list of spare parts to be stocked.

According to the movement of engines (which is continuously tracked by DEC) the dealer is notified if his parts stock is not considered adequate for the engines in operation in his territory.

This does not require as big an investment for the dealer's as it may seem. The two families of aircooled Deutz diesels have been designed for minimum parts stock requirements, with emphasis on interchangeability of all wearing parts—all models feature single cylinder construction. Therefore, it takes surprisingly few parts to maintain a given number of engines of different models.

Training courses for customer's operating personnel are being held in close cooperation with the dealer.

Diesel Power asked about Deutz's success with OEM accounts in this country. In the past years they have accumulated a growing list in mining, drilling, and construction fields, among them: Getman Bros, Young's Machine Co., L. A. Jones, Wagner Mining Scoop, National Mine Service, Vibro Plus, Bros Inc., Shovel Supply, Essick, Tampo, Seaman Gunnison, Ideco, Longyear, Odgers Drilling, Sprague & Henwood, Otis, Grose, DEMCO, Wade Mfg., Hol-Gar, Atlas Copco., J. A. Freeman & Sons.

DEC's staff feels that the domestic OEM sales success, while primarily due to the aforementioned factor of a quality products and the particular emphasis on service, was also influenced by the individual attention devoted to every OEM account regardless of its size.

Around the World in 104 Countries . . . .

In the DEC office on 82 Beaver Street in New York City is a map showing the location of its international business. Down in Argentina a forest of pins were stuck in the map, representing all engine and generator equipment for South America's longest pipeline, Compo Duran—Buenos Aires; a 4500-kw power station for the Ford Motor Co. and a 2000-kw power station for Chrysler Corp. In Teheran a pin designated a 2000-kw power station for B. F. Goodrich; in Bangkok two pins for two power stations for Ray-o-Vac and Merck & Co. in Japan marine engines for the biggest American fleet operators, in South America numerous power stations for mines, port facilities and the well-known Nestlé food-concern. Chains of pins marked generators supplied for major US Communication Engineering Companies in Africa and Asia.

Deutz has representatives in 104 countries of the Western world . . . enabling them to offer their US international accounts exceptional service facilities. This means, among other advantages, that they don't have to stock too expensive a parts inventory—or have their own mechanics constantly available.

Plans for the Future . . . .

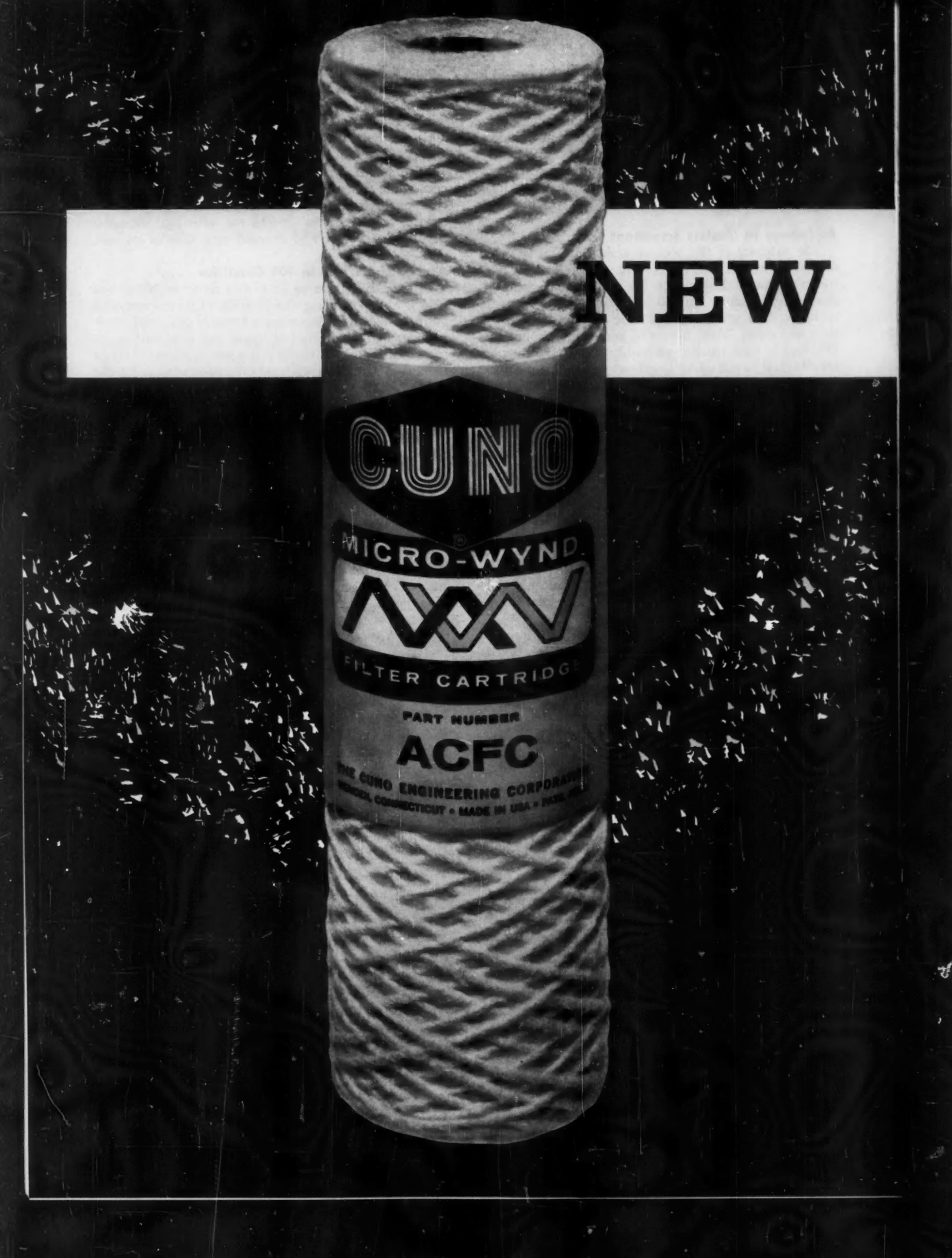
The comments of DEC's staff can be put into a short fomula:

"We believe the first basis for a sound business relationship is confidence. Just one customer who's unsatisfied because of poor service or parts supply can wreck a lot of good reputation. Therefore, we plan to move thoroughly, modestly . . . after all, Deutz has been doing business successfully for 96 years.

"We will always keep in mind that our customers aren't buying just a pretty package, aren't buying fancy claims— *they're investing in equipment.*"

There's a A6L714 Deutz in this Getman ore carrier.

Wagner's Mine Scoop equipment uses Deutz F6L712.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There's more to MICRO-WYND, too, than meets the eye. Graded density in depth, or ability to trap progressively finer particles from O.D. to core, is achieved by controlled dispersion of the separately applied layer of filter fibers. Strict control of winding yarn tension and method of application also gives you a cartridge that is structurally strong, that assembles in multiples without extra end sealing devices, and that stands up under the toughest operating conditions.

Get the facts *now* on MICRO-WYND . . . the all-new wound cartridge that's designed and built to set new filtration performance standards in your plant!

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DIESEL STARTING with AIR

Builder of air-starting systems states case for "cranking up" with air.

by Adolph G. Ringer Assistant Manager
Pneumatic & Electric Tool Div.
Ingersoll-Rand Company

Using an air starting motor to start a diesel engine has many advantages for over-the-road as well as off-highway and stationary equipment. Air starting motor systems weigh substantially less and are more compact than equivalent electric starting. They also eliminate heavy-duty generators and banks of heavy storage batteries. In installations where they have replaced electric starting, air starting has often paid for itself in one year through savings in battery replacements alone.

Cuts costs . . .

Maintenance costs are a big factor for over-the-road diesels. One freight carrier equipped with air starting cut the cost of cranking a fleet of 170-hp diesel tractors (see Fig. 1) by more than 80%. For the one carrier, this represented over $30 thousand per-year on a fleet of 93 tractors. They found their average electrical repair cost per tractor equipped with electric starting was $456.14 for labor and parts. On tractors equipped with Ingersoll-Rand air starters, electrical repairs averaged $72.80 and air starting repairs averaged $11.50; a savings of $371.84 per tractor.

Just reach down! Handy quick-opening valve is installed for easy air starting by drivers—save hundreds of dollars per year!

Trims weight . . .

A decided plus value for over-the-road diesels is the weight savings involved with air starting. Between 175 and 250 lb can be cut from the weight of each tractor, allowing that much increase in payload. With present gross weight limitations, weight savings are important.

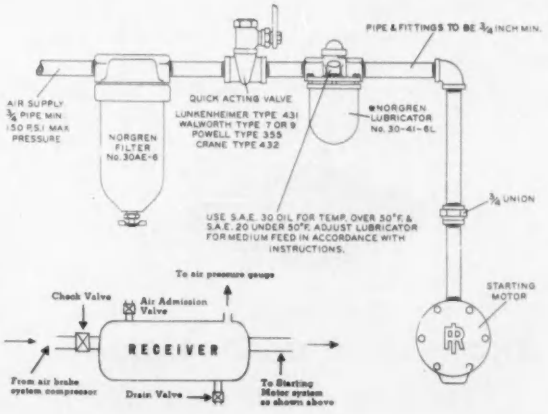
Increases Dependabiliity . . .

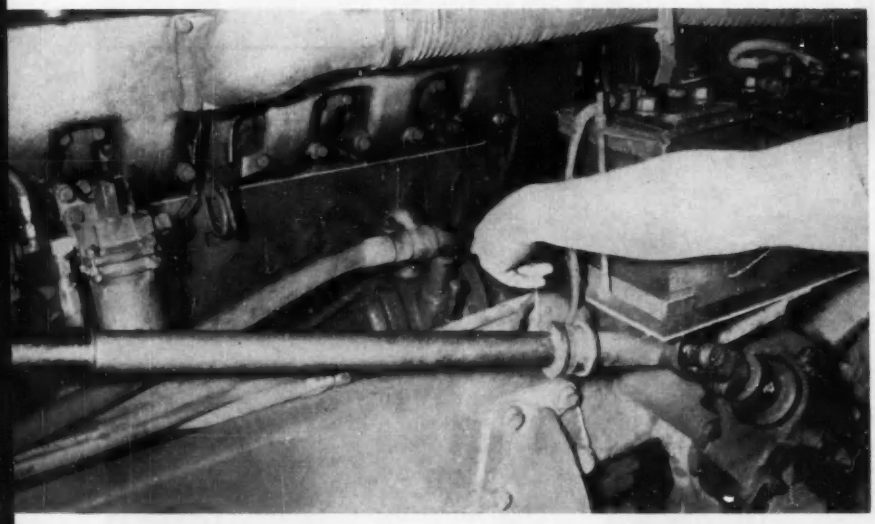
Dependability is a must for off-highway mobile and stationary diesel equipment. Superiority of air starting was amply proven on the Mesabi Iron Range on 20 and 30-ton ore trucks. Air starting has good characteristics at low temperatures. Low temperatures reduce efficiency of electric batteries by 60% or more, just when full power is needed the most. Air starting kicks over diesels at higher speeds regardless of the weather, resulting in faster starts.

Simplicity Pays off . . .

One reason for high performance and low maintenance cost of air-starting systems is simplicity of the system and ruggedness of components. If air pressure is depleted in the reservoir, any service station can recharge it in short order. On the other hand, if an electric battery is discharged, considerable time is needed to recharge it without excessive damage to the unit. In addition, there is a definite limit to the number of times a storage battery can be recharged. However, there is no limit to the number of times an air receiver can be recharged.

It's virtually impossible to burn out an air-starting motor. Ingersoll-Rand air-starting motors consist of a


PIPE & FITTINGS TO BE ¾ INCH MIN.
AIR SUPPLY ¾ PIPE MIN. 150 PSI MAX PRESSURE
NORGREN FILTER No. 30AE-6
QUICK ACTING VALVE LUNKENHEIMER TYPE 431 WALWORTH TYPE 7 OR 9 POWELL TYPE 355 CRANE TYPE 432
NORGREN LUBRICATOR No. 30-4I-8L
¾ UNION
USE S.A.E. 30 OIL FOR TEMP. OVER 30°F & S.A.E. 20 UNDER 30°F. ADJUST LUBRICATOR FOR MEDIUM FEED IN ACCORDANCE WITH INSTRUCTIONS.
To air pressure gauge
Check Valve
Air Admission Valve
RECEIVER
From air brake system compressor
Drain Valve
To Starting Motor system as shown above
STARTING MOTOR



Driver's hand points out compact I-R air starting motor on this H-61T Mack diesel. Air tank is only 56-in. by 13-in.—is easily installed in cab housing under sleeper.

Air Starters for Various Displacement Diesels
Table 1

Displacement	Air Starter
Up to 300 cu in., diesel	Size 3BM
From 250 to 500 cu in., diesel	Size 5BM
From 400 to 2300 cu in., diesel	Size 10BM
From 900 to 9000 cu in., diesel	Size 20BM
*Over 9000 cu in., diesel	Size 20BM

*if these large engines are presently equipped with electric starters.

Table 2 - Air Starting Motor Performance Data

Size Air Starting Motor	Weight lb.	Maximum hp			Maximum Torque ft.-lb.			Bendix Pinion Speed at Maximum hp rpm			Air per Start cu. ft.	Inlet Pipe Tap in.	Size Hose Recom. in.	Min. Air Receiver Capacity (Gal.)
Air Pressure at Motor-psi		90	120	150	90	120	150	90	120	150				
3BM	20	2.5*	3*	3.4*	17.3*	19.5*	21.6*	1610*	1670*	1720*	4	1/2	1/2	30
5BM	35	5.0	7.1	9.2	29	38.5	48	1960	1980	2060	5	3/4	3/4	30
10BM	30	13	18.4	23.8	53	71	88	2200	2340	2440	11	1	1	30
20BM	115	24	34	44	86	118	148	2580	2820	3050	17	1-1/2	1-1/2	90

* For 3BM air pressures are respectively 80, 90 and 100 psi

Table 3—Mounting Dimensions

Size	A	B	C
3BM	12-5/16	3-5/16	3⅛
5BM	15-15/16	4-7/16	3¼
10BM	17½	4-7/16	3¼
20BM	23⅜	5⅝	4-5/16

Table —Air Receivers

Size, Inches	Capacity, cu ft	Capacity Gallons	Max. Working Pressure, psi	Material	Bare Weight, lb
14x16	4	30	*125	Aluminum	49
20x30	4.7	35	*125	Steel	66½
20x34	5.4	40	*125	Steel	74½
20x38	6	45	*125	Steel	82½
20x48	8	60	160	Steel	170
20x63	10.7	80	200	Steel	255

*Not coded—all others coded (approved by National Board of ASME)

multi-vane air motor which starts the engine through a Bendix drive. Compressed air from 80 to 150-psi turns the vanes to supply from 17 to 340-ft lb of starting torque depending on the motor.

Selection Of Air Starter . . .

Air starting motors are made in a range of sizes (see Table 1) and systems to cover the entire range of diesel starting. All sizes are built interchangeable with electric starters using Bendix drives. Problem of selection is simplified since there is little overlap from size to size (see Table 2).

In the range of overlap, it is generally better to select the particular unit suited to the air pressure generated by the brake compressor. As with most other equipment, longer life can be expected by using the larger of two sizes at lower pressure than the smaller at higher pressure. This is also governed by mounting clearance for the unit.

This works both ways and for installations that do not have adequate clearance, it is possible at times to drop to a smaller air starting motor and run the system at higher pressure. This is particularly true for stationary diesel installations where greater flexibility is possible on the basic system as air pressure may be supplied from a high-pressure source.

Typical clearance dimensions for various size air starters are listed in Table 4. Cross check the information with a detailed drawing of the engine to be started. There are many models in each of the four basic sizes of air starting motors to fit practically any unit that is presently being started electrically through a Bendix drive.

Then your supplier will need to know two additional pieces of information to supply the exact model for your application:

1) Mounting dimensions of the Bendix housing, and

2) Piston data; i.e., pitch, number of teeth, pitch diameter and outside diameter.

Rest of a typical air starting system consists of an air receiver and piping from receiver to starting motor.

(Continued on Page 39)

Diesels-At-Work . . .

Dart's New End Dump . . . .

Here's Dart's 40SL, boasting a 40-ton capacity, reported to be one of the largest capacity 2-axle dumps ever placed into service.

It's seeing service in the famed Michigan Iron Range . . . equipped with Detroit Diesel's 12V-71 with heat-exchanger and BW air compressor. Starter is Ingersoll-Rand's 20BM . . . fulflow lube and fuel filters are by AC, bypass filter by Luberfiner.

Transmission is Allison's CLBT-5940 with dynamic retarder and AC filters . . . driveline is by Dana, 1800 HD front and 1850 HD rear. Rear axle is Dart's D-100, 3-reduction planetary . . . front axle is Dart's IFI cast I-beam, reverse by Elliott . . . air system and brakes by Bendix-Westinghouse. Radiator is Young's with Monoweld fin and tubes.

385

50-Ton Load . . . .

One of three MRS 200 Scrapers Morrison-Knudsen used recently on its Regina-Cleft (Idaho) highway project—a 650,000-cu yd grading operation. Working with three tractor-drawn scrapers, the MRS units carrying 50-ton loads helped speed up the earthmoving part of the job.

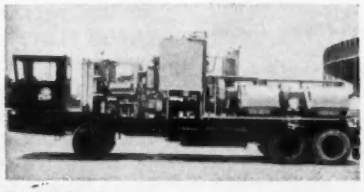
Before going to work on the project, the MRS units were repowered with GM Diesel 12V-71's. They're equipped with R1550 Fuller transmissions, AC full-flow oil filters and AC fuel filters. There's a couple of 12-volt heavy-duty Preco batteries aboard . . . and Farr 2-stage dry-type air cleaners with exhaust aspirators to clean the first stage.

386

Ford's 4000 HD Forklift . . . .

Lifts 4000-lb in 10, 12, 16 and 21-ft stacking heights. It's a Ford diesel . . . with Roosa Master fuel injection pump . . . Simms injectors . . . Purolator air cleaner and Champion glow plugs. Oil filter and transmission is Ford's . . . radiator by Long . . . thermostat by Dole.

387



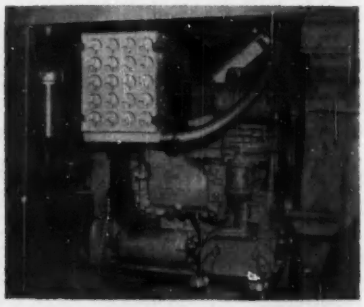
700-bhp!

This "Fieldmaster" oil well cementing unit was built from the ground up by Stewart & Stevenson. Chassis has an 18,000-lb front axle, 34,000-lb capacity bogie and features specially designed one-man cab. It's got two GM 8V-71's aboard, mounted side by side. Left diesel drives through an Allison torque converter and through an Allison power shift transmission which drives vehicle and one of the cementing pumps. Other engine drives through Fuller 10-speed mechanical transmission which drives through a S&S torque arm drive into the other cementing pump. Each of the 8V-71's is rated at 350 bhp.

388

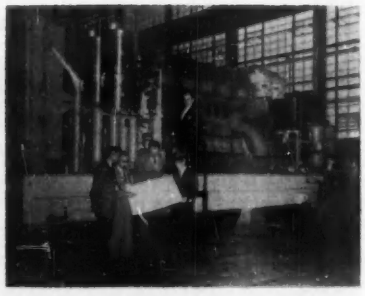
Farr Aboard Eimco 103 . . .

This 2-stage dry-type Farr air cleaner is attached to the left side of Eimco's 103 tractor diesel. Cleaner combines in series a centrifugal air cleaner with an after filter. Farr reports its got a 99% efficiency. Eimco's made 'em standard equipment on all their 103 tractor series.



Filter resistance of 3.5 in. wg at normal rating is reported. Only maintenance required is periodic replacement of the after-cleaner. Gauge attached to the air cleaner indicates when the after-cleaner needs your attention. Average life of after-cleaner is reported to be in neighborhood of 1500-hr.

389

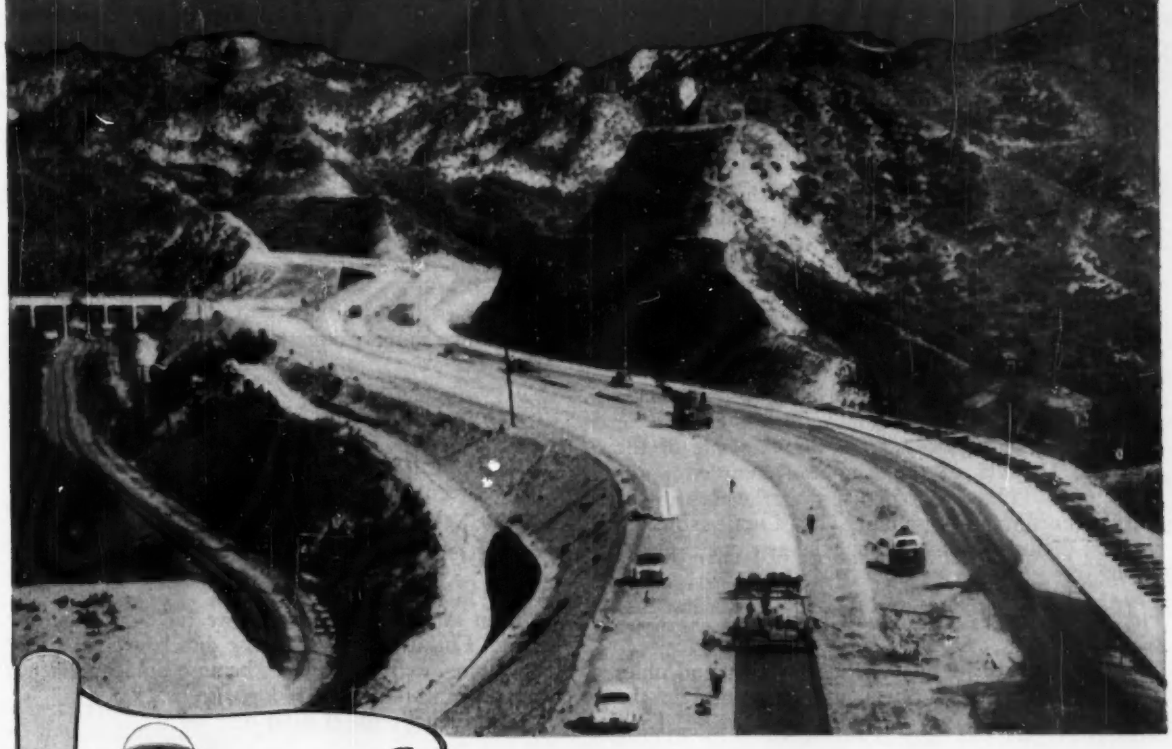


Portable Diesel Plant . . . .

This Fairbanks-Morse 900-kw portable plant is now at work turning out juice in Liberia. F-M's opposed-piston 1280-hp diesel drives a F-M 900-kw, 2-phase, 60-cycle, 2400 volt alternators . . . governors are Woodward's, radiator by Yates-American, jacket water pump by F-M. Thermostatic valves are Amot's . . . lube strainers by Hoffman-Allan with Air-Maze elements . . . fuel filters by Purolator, lube filters by Michiana. Air filters are Air-Mazes . . . exhaust snubbers supplied by Burgess, exhaust pyrometers are Alnor's. Starting air supplied by Westinghouse . . . switchboard by General Electric.

390

FOR ALL DIESEL POWER . . . MOBILE OR STATIONARY . . . wix



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Filter Survey by a WIX Factory-Trained Specialist plus a practical and valuable Maintenance Manual

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Volvo's L-488 . . .

(*Continued from Page 23*)

"Any transition problems with the drivers, from gasoline to diesel?"

"One. The synchromeshed gearbox allows a shift even when engine speed and road speed are not synched. At first they'd throw the shift and let the clutch out without trying to match revs. Making the clutch do the matching is hard on the facings. Fortunately, we found the problem and the answer right away. We just mentioned it once to the drivers."

"Has the equipment itself presented any problems?"

"Only one. The compressor bracket kept breaking off. It was the only flaw we found in the truck. We asked the service rep what we were doing wrong. These trucks had been running trouble-free in Europe for years, and suddenly we started breaking one of the brackets. He told us the European compressor was different, and they had to design a new bracket to take the Bendix-Westinghouse unit. They'd underestimated a bit on the original bracket; but the new one is plenty strong."

"Now for the important question. Are you saving any money running diesels?"

"Let's put it this way. Where every thousand miles our gasoline rigs use 144 gallons of gasoline, on the average our Volvos use 84 gallons of fuel oil. Each year, the gasoline tractors average 200 hours in the shop, while the diesels are out of service 125 hours. The difference is one man's salary for two weeks, *per truck!* Multiply this by thirteen trucks and you've got an extra man on your payroll. Spark plugs, points and condensers mount up, too.

"It doesn't require a mathematical wizard to calculate the length of time it takes us to write off the extra $2000 in original cost, and from there on in the savings are profit."

"One last question, Bill, You've got experience operating both gasoline and diesel trucks. As your present equipment wears out, what are you planning to replace it with?"

"I suppose it was necessary to ask the question, but I think you can make a pretty good guess at my answer. Those L-488's are just our size, and on the basis of their performance record we're replacing our gasoline trucks, one by one, with Volvo diesels. We now have three.

"We're in a competitive business where the difference between staying in and going out of business is your costs. We're enthusiastic about those diesels because we see the savings every day, every time we fuel up. After getting 12 mpg of fuel oil, we can't go back to seven mpg of gasoline.

"Then there's something else we can't put our fingers on. Enthusiasm. With those diesels, we get fired up because—well, I guess it's because our equipment seems to be *working right along with us.*

"We're strictly diesel from here on in!"

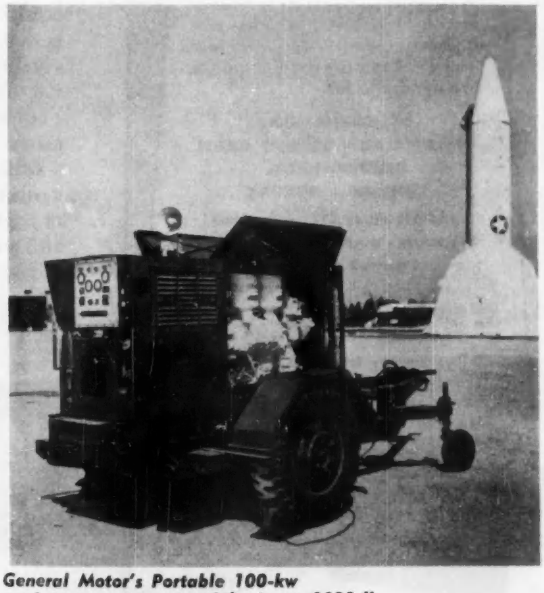
This 100-kw GM set is Jupiter's "standby"

General Motors—working in conjunction with the US Army Engineers—has developed a new lightweight, precise power 100-kw engine generator set. It's been picked for the vitaliy important job of supplying standby power for the Nation's Jupiter missile program.

Weighing only 6600-lb—approximately one-half the operating weight of the standard preduction model—this new GM diesel-powered set provides unusually close voltage and frequency regulation. Handles motors up to 75-hp as well as sudden heavy load changes. New set furnishes enough electricity to more than fill requirements of 60 homes well-equipped with electrical appliances!

Compact, the new set is 106-in. long, 36-in. wide and and 61-in. high—as compared with the 129 by 50 by 88 in. of the standard model. Incidentally, it's the largest kw rated unit to be mounted on standard Ordnance 2-wheel trailer . . . and will be also used in many military field applications where its portability comes in handy.

Reduction in weight and size, it's reported, was accomplished without sacrifice of maintenance features. Many engine accessories, as well as panel instrumentation and batteries are interchangeable with a family of engine-generators currently being developed by the Army's Research and Dev. Laboratories at Fort Belvoir.



General Motor's Portable 100-kw engine-generator set weighs in at 6600-lb.

(Continued from Page 35)
Size of receiver is important as this limits the number of starts that can be made without recharging. There are standard size air receivers in 30 to 80 gal capacity as shown in Table 4.

How many starts from a charge?

Number of starts possible without recharging the receiver is calculated as follows:

$$\text{Number of starts} = \frac{\text{receiver capacity (cu ft) x system pressure (psi)}}{\text{required air per start (cu ft) x atmospheric pressure (psi)}}$$

If your air motor has a built-in lubricator, an air line lubricator is unnecessary except for the largest size air motors. On all sizes, a filter and quick-acting valve should be placed in the supply line as close to the starting motor as possible. The valve should be between the filter and motor. If a lubricator is used it should be between the valve and motor.

As shown in the piping and receiver arrangement in fig. 2, an air-admission valve should be installed directly on the receiver. This permits the receiver to be charged from some external source such as plant or shop air lines, bottled air or nitrogen or service truck compressor. On highway trucks, a glad-hand air-line connector may be installed on the receiver so it may be recharged by connecting it to the glad-hand of another truck. Some manufacturers also include a tire valve on the receiver so it may be charged at any service station.

Selecting your complete air start system . . .

Problem: Electric repair costs are running high on a fleet of diesel tractors with 460 cu-in. displacement. Presently they are started through a Bendix drive. Air brake system is operating at 120-psi. What type air starting system would be requried for these units? The unit should start an average of four times without recharging.

Referring to Table 1 for the proper size air starting motor, it can be seen that 460 cubic-inch displacement falls in the overlap of the 5BM and 10BM I-R starters.

Second step is to check the overall dimensions listed in Table 3 to be sure of sufficient clearance.

The receiver size must be calculated for both units. 5BM

$$4 \text{ starts—receiver capacity} = \frac{\text{x 120 psi (system pressure)}}{\text{5 cu ft (air per start) x 15 psi (atmospheric pressure)}}$$

Required receiver capacity for four starts = 2.5

This is below the minimum size recommended for use with the 5BM according to Table 1. At least a 30-gal capacity is required.

A similar calculation for the 10BM using 11 cu ft of air per start indicates the required size for the receiver would be 5.5. The 40-gal capacity receiver would be just large enough, Table 4, but would allow no margin of reserve. By using the smaller air starting motor and aluminum 30-gal receiver, 30% can be cut off the weight of the system.

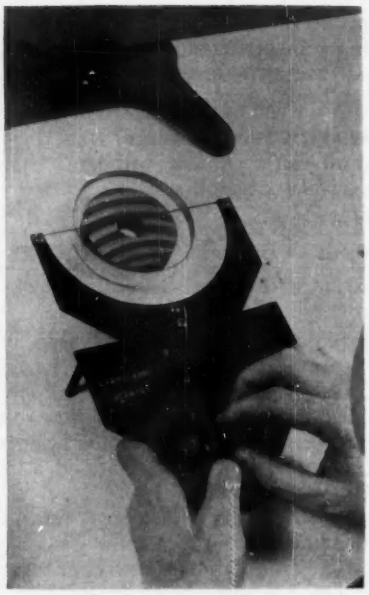
He drives the Lectra Haul . . .
'n she the sportscar.
"Pardon me, Dear,
while I pass under you!"

55 Ton Payload! Uses Electric Motors For Its Muscle!

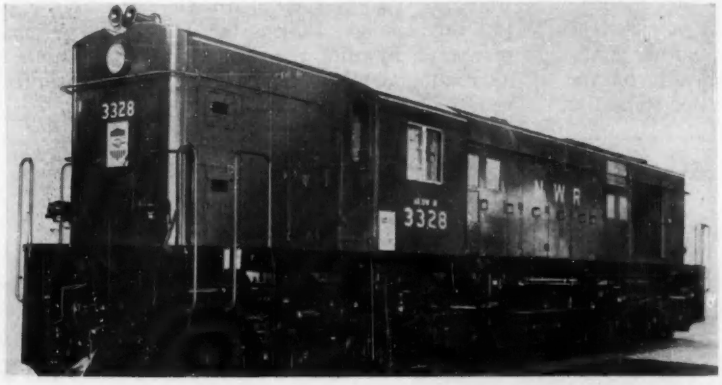
This maneuverable 110-ton giant can play follow-the-leader with a 15-ton dump truck. Lectra Haul cuts figure 8's right behind her smaller sister . . . whips around 180 degrees on a 50-ft road! Manufactured by Unit Rig & Equipment, she's 41-ft long with a 600-hp Cummins diesel that produces current for GE electric motors mounted inside the rim of each of her 4 wheels. Fully loaded with 55-tons, Lectra Haul takes 15% grades in her stride . . . and needs only 23 seconds to dump.

Easy to drive—no gears to shift and she's got a conventional steering wheel, foot throttle and brake pedal. Unit Rig & Equipment predicts their off-highway Lectra Haul should out strip mine hauling costs up to 30%. For one thing, individual electric wheel drive has streamlined the maintenance schedule—eliminating torque converters, transmissions, propeller shaft and drive axles as well as conventional braking system.

diesel power >> new products

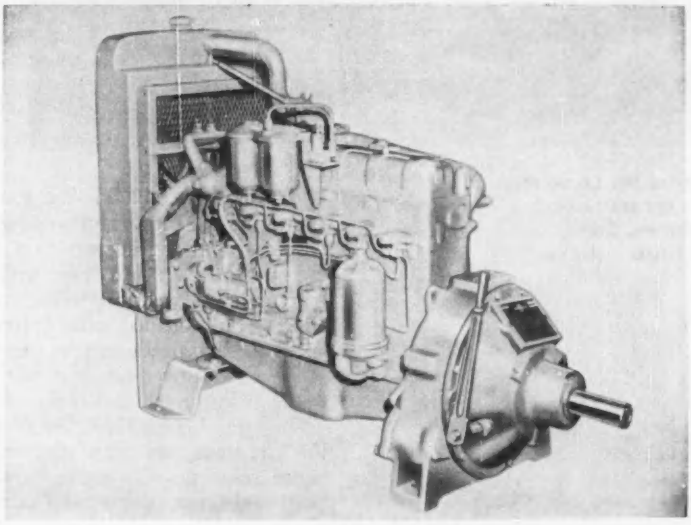


New Check For Flat Lapping . . .
Supplements your quality control operation . . . inspects and measures for flatness in injector equipment repair and other flat lapping. Use with monochromatic lamp and optical flat. Simply align cross hair image on one band, then vernier slide is moved until cross hair image aligns on next band . . . then, curvature of single band is measured. Value divided by band width value gives exact flatness of your part in light bands. Use simple arithmetic to convert to millionths of an inch.
340



Latest Alco Export . . .
This is Alco's DL-541, a 1800-hp diesel locomotive that's specially designed to meet clearances and axle loads found on foreign tracks. It's got a Alco Model 251, vee-type 12-cyl engine . . . six multi-gauge traction motors. Special features include double-size fuel tank . . . vacuum brakes . . . overspeed controls, speed recorder etc.
341

Allis-Chalmers' D-262 . . .
A-C's 77-hp at 2200 rpm diesel (thoroughly tested on their motor grader and front-end tractor loaders, farm tractor and combines) is now available for general commercial applications in the oil fields, construction, mining and quarrying, irrigation, logging and agricultural fields. Bore and stroke is 3-9/16-in. by 4-3/8-in. Displacement, 262 cu in.
342



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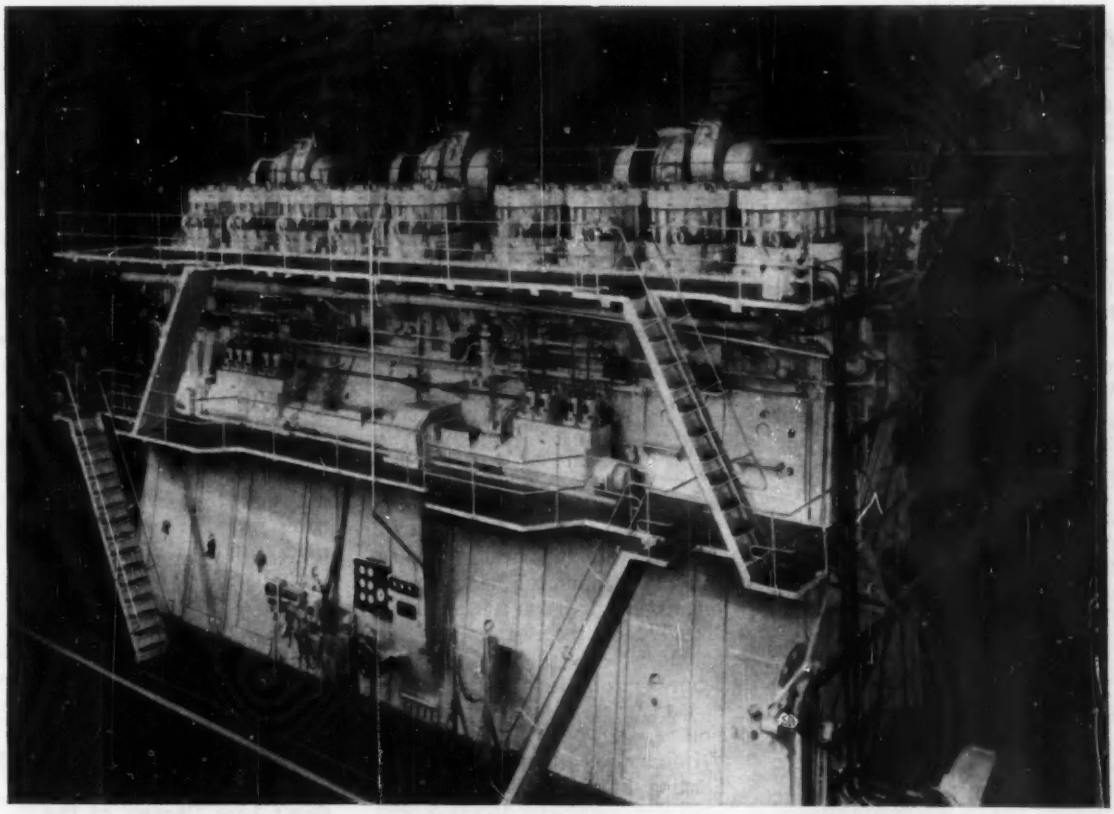
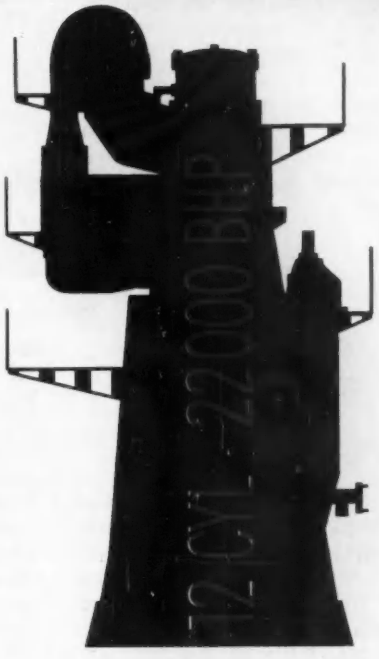


Nine-cylinder version of the KZ 84/160 engine developing 15,500 BHP (metric) at 115 r. p. m., built by Yokohama Shipyard for a 40,000 ton tanker.



UP TO 22,000 BHP

Largest type of the well-known M.A.N. two-stroke Diesels: KZ 84/160 with a bore of 840 mm and a stroke of 1,600 mm. This engine develops, depending on the number of cylinders, between 10,000 and 22,000 BHP

M·A·N

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For more information write in No. 320

Flexible Connectors Stop Noise at the Source

Allied Metal Hose Company has introduced a new "H.A.P." Flexible Pump Connector which absorbs or reduces the troublesome effects of pipeline vibration, misalignment or thermal expansion in pump installations.

Because the flexible connector will absorb and isolate vibration, very little will be transmitted to the piping system. Therefore, many disturbing noises throughout a building can be arrested at the source.

Consisting of a short section of corrugated flexible metal tubing, protected against pressure elongation by wire braid, these connectors are furnished with threaded or flanged end connections to fit all standard piping sizes.

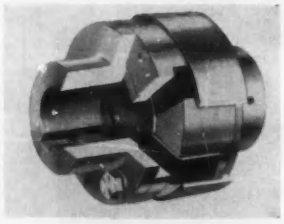
343

New Couplings for Diesels!

Lovejoy's flexible couplings, in standard-duty type CQ and heavy-duty type HQ, incorporate one set of jaws in removable ring form, permitting both independent rotation or radial removal of connected machinery.

Take advantage of these features with diesels where the driven machinery must be disconnected in order to set or time the engine.

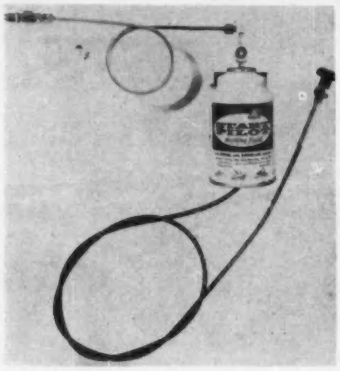
There's no wear on the metal



jaws; no lubrication needed. The couplings employ individual free-floating load-cushions of material suited to the particular application with the full load transmitted through cushion compression only.

Type CQ flexible couplings are available with maximum bores from 1⅜-in. to 5½-in. They range from 2.58 hp to 156 hp at 100 rpm. Type Hq range from 1¾-in. to 8½-in. with hp from 7.77 to 810 at 100 rpm.

344



A Do-It-Yourself Starter

Start Pilot Corporation is making aerosol can primers for use with all brands of aerosol can starting fluids. Install it on the instrument panel or under the hood. Starting is then a one-man operation, with the driver working from his operating position.

Information about Aerosol Can Starting Fluid Primer, Model No. 1200 is available—use Reader's Service Card!

345

More Batteries in Exide's Industrial Line

Nickel-cadmium batteries have been added to the Exide line of industrial storage batteries. Users are now offered a wider range of choice for specific power needs in applications such as emergency lighting systems, emergency communications and safety equipment in marine service, switchgear tripping in electric utility substations, starting engines to generate emergency power.

These new Exide Nickel Cadmium Batteries are best where power demands are extremely intermittent . . . where batteries must remain capable of high rates of discharge despite long periods of idleness, partial discharge, or advanced age . . . and where only minimum, infrequent maintenance and service are possible.

Exide's new line is available in 22 electrical sizes, with 8-hour capacity ratings ranging from 10 to 450 amp-hrs as well as other special types and sizes.

346

New Diesel Concentrate

Behnke Lubricants tested their new Diesel Concentrate (ashless dispersant) by supplying it to a nationally known trucking fleet for one year before offering it to all diesel users. Results? Average mileage per unit at the beginning of the test, 72,000 mi; average load, 29,000 lb. At the end of the test, average mileage per unit, 153,000 mi. New concentrate costs but one-tenth of a cent to use.

Jax DC #5, when added regularly to the diesel fuel, it is claimed cuts downtime by 80% . . . eliminates reverse flushing of injectors, more than doubles injector life, prevents formation of gum or lacquer on injector plungers. Also it's reported that Jax prevents plugging of injector cups and metering holds, reduces excessive exhaust stack smoke, disperses moisture and keeps fuel lines open.

347

Don't Lose Control of the Situation!

Plant maintenance at a glance! Magnetic control boards, developed by Methods Research Corp., help supervisory personnel with scheduling and planning their PM programs. Makes a change as easy to make as moving a magnet, when emergencies arise.

Use the Magnetic Control Board for scheduling, renovating, machine control, location control of utility work crews, production planning, etc. Standard size is 24-in. x 36-in., but any size can be made to order.

348

Low-Cost Speed Monitor Introduced

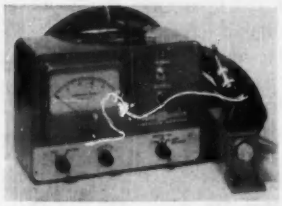
It's new, by Knecht's, Inc.! A Speed Monitor that converts variable input drive speeds into a constant output speed, despite varying accessory loads. Speed Monitor is a break-through in cycling AC generators full-time from mobile equipment . . . and an optimum speed regulator of compressors, pumps, supercharger blowers, DC generators and flexible drive cables. Self cooling, too!

349

On Guard! Against Vibrations!

Stewart-Warner's latest device from the Industrial Balancer Department not only stands guard on your equipment, ready to stop it when the machine exceeds safe limits of vibration amplitude, but also, with an accessory plug-in attachment, becomes a portable balancer to be used to correct the condition.

Some of the applications for which the new vibration monitor is being used include protection of



diesel engines . . . gas turbines and pump motors at remote locations. In most cases the unbalanced, vibrating part can be corrected in place and at once!

Boasting greater versatility yet, the device features a "tuneable" pick-up, filtering out extraneous vibrations through mechanical resonance, excluding all vibration frequencies except that for which it has been pre-set. There's a "go, no-go" gauge for testing equipment with rotative parts having a vibration limit.

350

Band-It Introduces New Hose Coupling

There's a new concept in hose couplings produced by the Band-It Company. Called Band-It "Piggyback" Tri-Lokt hose nipple . . . it is said to fit any hose O.D. or wall thickness, regardless of hose construction.

It consists of one hose nipple and one yoke. The yoke is locked by two Band-It Jr. stainless steel clamps, one on top of the other "piggyback" fashion.

Five sizes are now available for ¼-in., ⅜-in., ½-in., ¾-in. and one-in. I.D. hoses, hydraulic, double and single braid, steam, and all hose requiring positive locks to the hose nipples.

351

New Filter Material Passes Tests with Flying Colors

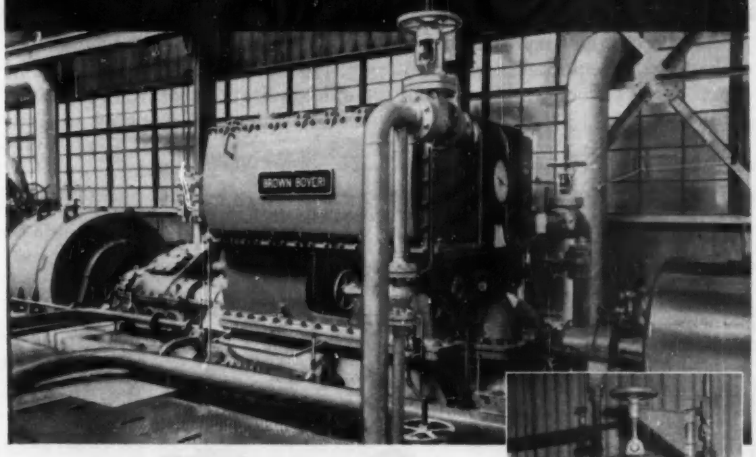
Troyfelt, a dacron type material, won honor in tests run to evaluate performance of filters for the Chrysler-built US Army M-60 diesel tank. Specifications included almost 100% efficiency in "zero visibility" dust conditions, ability to operate in ambient air temperatures from —65°F to 125°F, and the ability to withstand oil, moisture, rot and mildew.

Troyfelt, a product of Troy Blanket Mills, proved tops in performance, uniform strength, cleaning efficiency and operating life. Ease of maintenance under all types of operating conditions is another out-front advantage. Reports are that Troyfelt requires only a good shake to remove the dirt—then it goes back into the cleaner assembly ready to go to work again!

352

NUGENT FILTER

protects gas turbine bearings



Recharges changed just once a year

One Nugent Filter, Fig. 1555-4L7 handles all the lubricating oil for this 3000 HP Brown Boveri Gas Turbine. Continuous full-flow filtering removes harmful impurities before they can form sludge or acidity. Foreign particles 5 microns and smaller are trapped. Recharges are changed only once a year, due to extended capacity.

Need a single filter or a complete system . . . contact Nugent, today.

Nugent Fig. 1555-4L7 Filter uses laminated disc recharges.

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SIGHT FEED VALVES • FLOW INDICATORS

For more information write in No. 321

diesel power » new literature

It's A Truck Log, Courtesy of International Harvester!

How's your truck doing? Check it for a year with this truck cost record book now being offered free of charge by the motor truck division of International Harvester Company.

Each 20-page book permits the maintenance of accurate records of all fixed, operating and maintenance charges against one truck for a full year. There's a driver daily report to go with the book, providing space for information such as number of trips, time, number of stops, mileage, loads and fuel and oil consumption.

Use these handy report forms to evaluate your equipment performance! To get your copy, use our Reader's Service Card!

353

Use your dp Reader Service Card.

It's Spark-Free to be Safe!

That's the story as far as Kato Engineering's latest addition to the a-c generator family is concerned. The new, complete line of explosive-resistant, brushless alternators are featured in Kato's new 16-page 2-color brochure.

Non-wearing components replace such wearing parts as commutator, slip rings, brush holder assemblies and brushes.

Kato's brushless generators, like the brush type, are available in 2-bearing design for belted and direct-coupled use with prime movers at no extra cost.

The booklet includes descriptions and applications of Kato's control equipment as well as power systems.

354

BIG JOB...SMALL ENGINE?
YANMAR
DIESEL DOES IT!
SAFE
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4-Cycle — AIR-COOLED — Single Cyl. 2 to 4½ BHP — 2000 3000 RPM. LIGHT WEIGHT — EASY STARTING. Especially recommended for PORTABLE & EMERGENCY EQUIPMENT.
A Precision Product of the New Japan. Made to U.S. specifications by the world's largest manufacturer of small diesels. COMPLETE ACCESSORY LINE. All engines and parts stocked in the U.S.A.
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CONTINENTAL MACHINERY CORP.
19402 So. Susana Rd., Compton, Calif.
Mailing Address: P. O. Box 5309, Long Beach 5, California

For more information write in No. 322

New Volvo Truck Catalogs Just Off The Press!

Volvo has been a familiar name in the international truck manufacturing field for the last 30 years. Currently these Swedish craftsmen are offering US truckers three diesel tractor models, 95 to 195 hp, 40,000 to 68,000 GCW, 4-cycle, 6-cyl.

Colorful, complete brochures give you a good idea what Volva has—their 95-hp L 375 for medium-duty city pickup and delivery work . . . their 125-hp L 488 (described in a feature article elsewhere in this issue of DIESEL POWER) . . . and their large 162-hp L 498, the heavy cross-country tractor that is also seeing service in dump body and transit-mix work.

Most of the critical parts on these Volvo tractors are American made—over 1/3 in fact! If you're in the market for a good economical truck—better jot down the number on your Reader Service Card. Brochures will be in the mail to you pronto!

355

Cuno Tells the Story of its Self-Cleaning Filters

A filter selector chart and a complete set of flow tables are but a couple of the features of Cuno's new catalog on Self-Cleaning filters.

Sixteen clearly illustrated pages in two colors highlight the virtues of the line of Auto-Klean and Super Auto-Klean Filters. There's a complete listing of the units which are all-metal edge-type with no cartridge replacement necessary.

The catalog, Number 51-100 shows the unit in a cut-away view, demonstrating the self-cleaning action. It's a good folder for your file!

356

These all work for the Railroads!

Nalco Chemical has digested its services and chemicals designed specifically for the railroad industry.

In an attractive, profusely illustrated four-page folder, such subjects as weed and brush control, flange lubrication, water treatments for diesel cooling systems, steam generation and cooling towers and fuel oil treatments are fully covered.

357

(Continued on page 47)

these cards will bring you more information!

1 Simply note the numbers under advertisements and editorial items which interest you.

2 Then, write the numbers in the boxes on a card at right.

3 Fill in your name and address. Check off type of work you do.

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- ☐ Railroad Transportation
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- ☐ Mining & Quarrying
- ☐ Municipal Power Plant
- ☐ Utility Power Plant
- ☐ Consulting Engineering
- ☐ Engine or Equipment Manufacturer
- ☐ Engine or Equipment Distributor
- ☐ Engine or Equipment Service and Repair

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- ☐ Mining & Quarrying
- ☐ Municipal Power Plant
- ☐ Utility Power Plant
- ☐ Consulting Engineering
- ☐ Engine or Equipment Manufacturer
- ☐ Engine or Equipment Distributor
- ☐ Engine or Equipment Service and Repair

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4 Mail the card. We will pay postage and see that the information you requested is sent to you.

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Start your subscription Today!

NEW LITERATURE . . .

(Continued from page 44)

Coatings for Protection

Contributions of Acheson dispersions in assembly and run-in applications are the subjects digested in Acheson Colloids Company's Bulletin 421.

The 2-color brochure attractively outlines use of these dispersions as assembly and run-in lubricants for the automotive, industrial, agricultural, commercial and aircraft industries.

The protective coatings described cut destructive action of oxidation and corrosion, make a shorter run-in period possible due to immediate protective quality, permit increased power from reduced friction, lower bearing temperatures by decreasing friction.

358

Kohler Monthly "Paper" published

"World Wide", published by the Kohler Company Electric Plants is an attractive, illustrated two-color bulletin digesting the Kohler Electric Plant story . . . its people, its products . . . their applications. The Wisconsin firm manufactures electric plants for use "on the air . . . on the sea . . . and everywhere! The informally written bulletin is a companion to another company publication, Kohler Engines in "Action."

359

Test In a Kit . . . a real money saver!

It couldn't be easier . . . just see and save with Lengor's new Simplex portable motor-oil testing kit for your engines, diesel or gas.

Efficient, cheap, fast! Proven, too by use. Be sure to get your copy of the new catalog, complete with illustrations and an impressive list of satisfied customers!

You're way out ahead, if you can catch a flaw while it's easy to fix, before the engine is ruined. The kit will reveal excessive abrasive solids in oil, detect water or anti-freeze in engine oil, expose damaging fuel dilution, show up harmful corrosive acids . . . all on-the-spot!

360

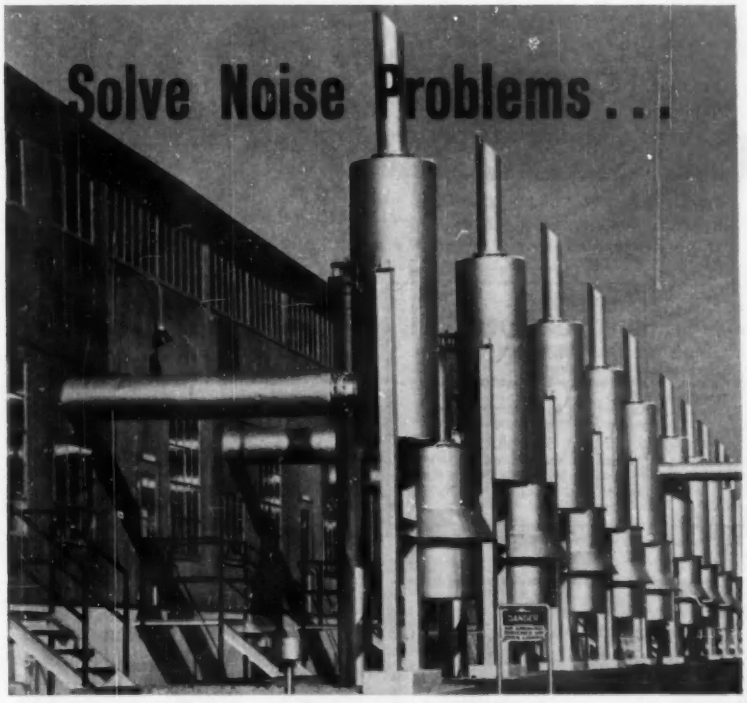
44 Pages of Clamps and Couplings

Marman Division of Aeroquip has just released a 44-page catalog containing complete product info—on industrial band clamps, hose clamps, couplings, flanges and V-band joints for all types of applications. You're sure to find what you're looking for whether for maintenance or original equipment use. All design information is there for engineers, too!

Products covered in the new catalog include: band clamps for automotive uses, identification tag clamps, light and heavy-duty repair clamps, Marman V-band couplings and flanges for general industrial original equipment uses, pipe joints . . . for joining pipe without cutting or threading, and CONOSEAL tube and pipe joints for sealing under extremes of temperature from −450°F to +1500°F with pressures up to 20,000 psig.

Marman equipment is designed to save manufacturing time, aid in servicing, and "pretty-up" the prod-

361



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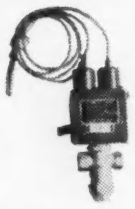

Government Surplus, BRAND NEW, in factory packages. List price $125.00 Provides positive protection against high water jacket temperature and low lubricating oil pressure. Adjustable temperature cut-off range 180-210 degrees; max. oil pressure 75 lbs.; adjustable cut-off range 2-25 PSI. Automatically shuts off engine fuel oil supply and drains fuel line between shut-off valve and injection pump. Supplied with 6' long tubing to temperature bulb. 11" h., 6" w., 2¾" deep. Shpg. wt. 12 lbs. FOB Chicago.

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- Rocker Parts
- Push Rods
- Cam Follower Parts
- Hose Assemblies

Pacific DIESEL Parts Co.

4650 E. Florence Ave., Bell, Calif.
Mail Address—P.O. Box 1007
LUdlow 1-6082

For more information write in No. 326

NEW DIESEL POWERED EQUIPMENT:

Pathfinder . . . .

Allis-Chalmers Forty Five motor grader paves the way to increased production by allowing a pair of TS-260 motor scrapers to operate safely at high speeds. Reports are that scraper maintenance and fuel costs are reduced . . . operator fatique is lessened.

Value of adequate haul roads has become more significant as earth-moving machinery has improved in speed and capacity. There's no place for the old "oxcart" haul road in today's construction project!

Whether you're moving dirt for a new super highway, skidding and hauling logs, moving rock from a quarry, or handling a sanitary land-fill operation, a good haul road is going to help make your operation just that much more efficient.

380

Lightload/Shorthaul

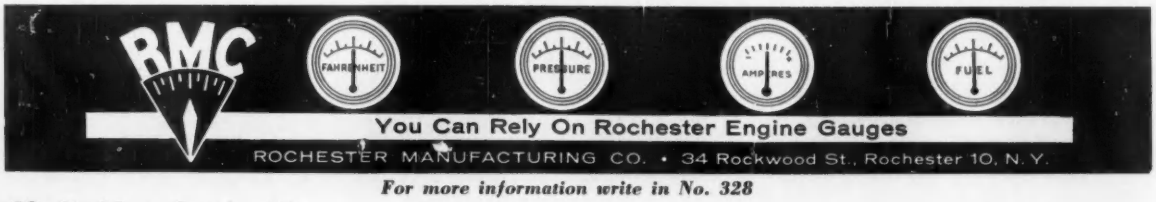
International Harvester's model B-160 truck (left, a medium duty unit and I-H's BC-160, right) are now available with a new I-H D-301 diesel, factory-installed. Price premium is only $1100 for diesel vs gasoline! Rated at 110-hp, the D-301 is designed for stop-and-go city delivery work as well as other lightload/shorthaul applications.

It's a high torque, lightweight powerplant that weighs only 902 lb, or 8.2 lb per horse-power! Direct 12 volt electric starting and a simplified fuel system are design features. International's B-160 and BC-160 series trucks are rated at 16,000 to 19,000 lb gvw.

Bore and stroke for I-H's new 301 is 3.812 by 4.390-in. Compression ratio is 18 to 1. I-H indicates that parts and service will be available throughout US in I-H truck dealers and company-owned branches.

381

For more information write in No. 327



For more information write in No. 328

New Dodge Diesel . . . .

Largest of the '61 Dodge truck line, this giant NCT-1000 tractor features a Cummins NH-220 diesel with a displacement of 743 cu in.

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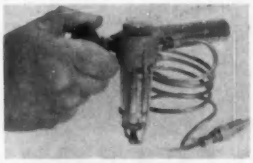

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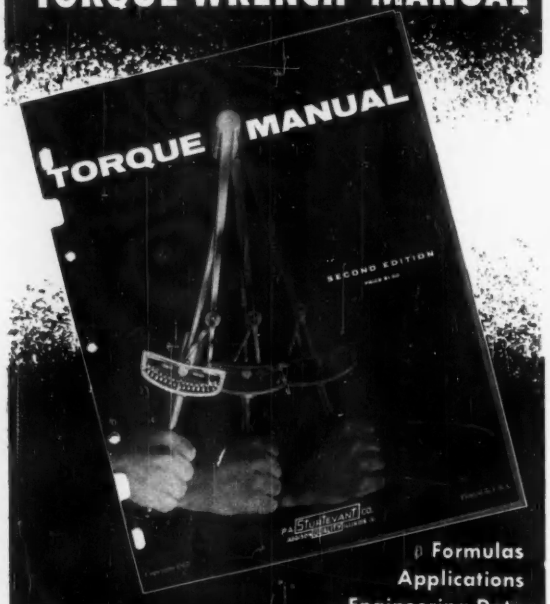

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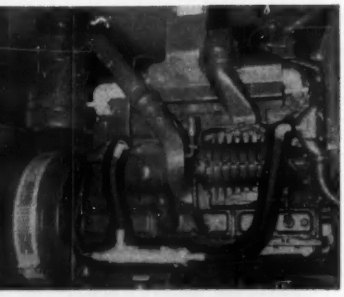

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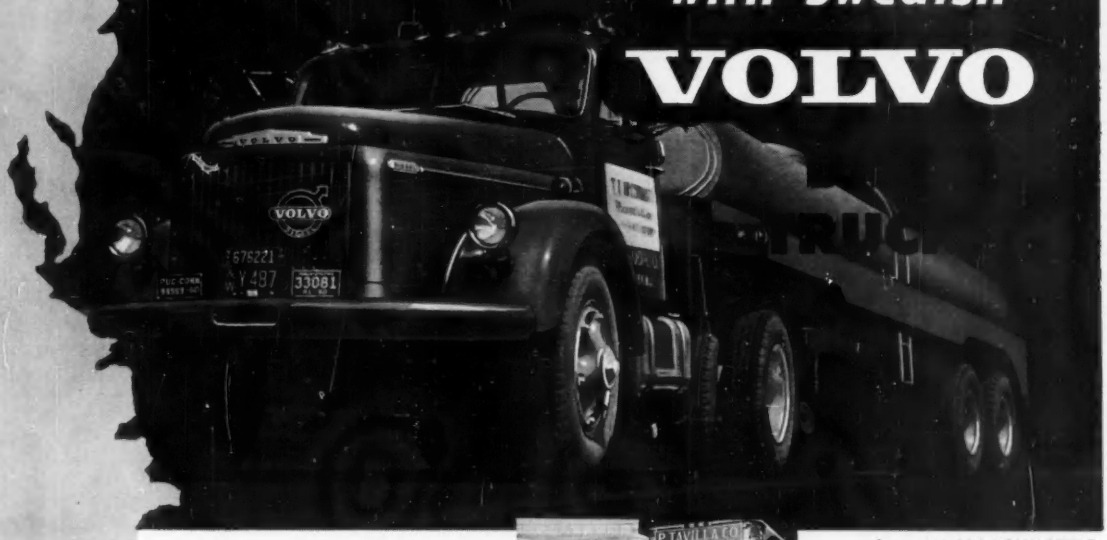

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